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**THESIS**

**ASSESSING THE STRATEGIC UTILITY OF THE HIGH  
NORTH: THE COLDER WAR**

by

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December 2016

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## **ABSTRACT**

Russia's current policy and associated expansion in the High North directly contrast the United States' weak Arctic policy. To secure its objectives in the Arctic, the United States—which has constrained diplomatic, military and economic resources for foreign relations—must assess if Arctic investment is truly worthwhile. This thesis will examine the military dimension of Arctic expansion and assess the risk and overall investment of U.S. militarization against diplomatic agreements. Using Senturion modeling and simulation software via closed-loop capstone wargames, this thesis helps forecast potential implications of various U.S. Arctic policy avenues across the spectrum of known stakeholders and against each stakeholder's stated or perceived preferences.

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## **LIST OF ACRONYMS AND ABBREVIATIONS**

EUCOM	European Command
GDP	Gross domestic product
ISR	Intelligence, surveillance and reconnaissance
NATO	North Atlantic Treaty Organization
NSR	Northern Sea Route
NWP	Northwest Passage
OIF	Operation Iraqi Freedom
SAR	Search and rescue
U.S.	United States

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## EXECUTIVE SUMMARY

The Arctic High North is rapidly emerging as a geopolitical, military and economic strategic area of interest for a wide range of stakeholders and for a variety of reasons. The rapid melting of Arctic sea ice has triggered dramatic increases in exploration activities and interest in this resource-rich environment. The High North has experienced some of the most rapid, abrupt environmental changes on the planet over the past two decades and as such has become far more accessible and may shape the strategic arena for the foreseeable future.<sup>1</sup> For instance, as the Northern Sea Route and Northwest Passage become more navigable, they will experience a dramatic increase in use; this means approximately two thirds of total world trade passing through the Suez Canal will be rerouted to the Northern Sea Route.<sup>2</sup> This new ease of use in the High North oceanic passageways will increase the need for appropriate security measures within the region and present a new range of global challenges for stakeholders.

While there are only five High North coastal states—the United States, Canada, Russia, Norway and Denmark (Greenland)—Arctic countries with direct geopolitical ties to the region also include Sweden, Finland and Iceland. Although there are high levels of international cooperation among the eight countries, the High North will continue to be an emerging security concern. Russia, for example, has followed through on announcements that it would increase military presence in the High North and has staked claim to territory below the ice’s surface.

In order for the United States to execute three key lines of effort—advancing United States security interests; pursuing responsible Arctic region stewardship; and strengthening international cooperation, as outlined in the 2013 “National Strategy for the Arctic Region”—there must be a concerted effort to align actions and assets with outlined policies already in place.<sup>3</sup>

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<sup>1</sup> The University of Maine, Climate Change Institute (Orono, ME: University of Maine, 2016): 7.

<sup>2</sup> Study by the Netherlands Bureau for Economic Policy Analysis (CPB),  
<http://worldmaritimenews.com/archives/161360/study-northern-sea-route-to-overpower-suez-canal/>

<sup>3</sup> White House, “National Strategy for the Arctic Region,” 2013.

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Currently, the United States is not prepared to meet the demands of operating within the High North. The United States has only two heavy icebreakers (note: 2013 mission needs statement dictates six); both have exceeded their 30-year service lives and one is completely nonoperational.<sup>4</sup> In order to execute its three lines of effort within pending fiscal constraints, the U.S. must negotiate a balance of shared responsibility among regional stakeholders.

This research incorporates stakeholder current capabilities, economic status and associated policies in order to populate Senturion with the categorical values required to represent each stakeholder. The assigned values are based on country proximity, power, position and overall influence as related to various issues centered in the High North area of concern. The Senturion modeling software was used to identify where future stakeholder negotiation opportunities are most likely to prove diplomatically beneficial. This research will also reveal the appropriate level of investment required from a military perspective to best meet United States security concerns in the Arctic.

## References

- Department of Homeland Security. “Polar Icebreaker Mission Need Statement, Version 1.0.” June 28, 2013.
- Netherlands Bureau for Economic Policy Analysis (CPB),  
<http://worldmaritimenews.com/archives/161360/study-northern-sea-route-to-overpower-suez-canal/>
- The University of Maine. Climate Change Institute. Orono, ME: University of Maine, 2016.
- The White House. United States National Strategy for the Arctic Region. May 2013.  
[http://www.whitehouse.gov/sites/default/files/docs/nat\\_arctic\\_strategy.pdf](http://www.whitehouse.gov/sites/default/files/docs/nat_arctic_strategy.pdf).

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<sup>4</sup> Department of Homeland Security, “Polar Icebreaker Mission Need Statement, Version 1.0,” June 28, 2013, 9.

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## I. INTRODUCTION

Only when the ice breaks will you truly know who is your friend and who is your enemy.

—Inuit Proverb<sup>1</sup>

### A. THE STRATEGIC PROBLEM

Russia shows great interest in the Arctic High North, both economically and militarily, but the region has yet to emerge as a true priority for the United States. Still, exploration activities there have drastically increased, and there is a newfound interest in this resource-rich area. The drastic reduction of Arctic sea ice over the past decade has focused policy attention toward the region in an attempt to best utilize an ice-free Arctic within decades (see Figure 1). The changes to the Arctic brought about by warming temperatures will allow an increase in exploration for oil, gas and essential minerals not only for the five Arctic coastal states—the United States, Canada, Russia, Norway and Denmark (Greenland)—but for countries such as China as well.<sup>2</sup>

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<sup>1</sup> Sean A. Stein, *The Submarine--The Key to Winning an Arctic Conflict*, Naval War College Newport Ri Joint Military Operations Dept., 2013, 1.

<sup>2</sup> Ibid.

Figure 1. At the Top of the World<sup>3</sup>



This image shows the diminishment of Arctic sea ice and the increased use of the Northwest Passage and the Northern Sea Route. As the ice continues to melt, ease of access to oil and gas exploration coupled with the commercial shipping and tourism industry will bring forth a new set of strategic and geopolitical challenges. This is the fundamental basis for why we believe this region to be an area ripe for a potential “New Colder War.”

Although there appears to be significant international cooperation on Arctic issues, despite Russia’s potential to dominate in the region, it is increasingly being viewed by concerned countries as an emerging security issue and ultimately could become a security threat. This security issue stems from its geographic and economic importance combined with the military capability that could be leveraged within the High North, including but not limited to permanent basing options, power projection, large-

<sup>3</sup> Source: Graphic by Stephen Rountree; see Thomas Omstead, “Global Warming Triggers an International Race for the Arctic,” *U.S. News & World Report*, October 9, 2008, <http://www.usnews.com/news/world/articles/2008/10/09/global-warming-triggers-an-international-race-for-the-artic..>

force exercises and the extension of global reach. With the release of the Russian National Strategy in December 2015, it became evident that Russia will continue to aggressively pursue access and resources in the Arctic that will afford it full freedom of maneuverability and uncontested operations.

## **B. RESEARCH QUESTION**

While there are clear Russian-stated policies and ongoing associated actions to enact those policies in the High North, the United States currently lacks similar comprehensive Arctic policies and, where such policy exists, there is a gap in the resources needed to execute it. Based on the time it would take to organize, train and equip resources using the whole-of-government approach and to secure U.S.-stated policy objectives in the Arctic, the United States is at a pivotal point in deciding if an Arctic investment is truly worthwhile. As the diplomatic, military and economic resources required to execute foreign policy on a global scale are limited, the United States must choose where to place its emphasis. This presents the following root question: How should the United States implement and prioritize instruments of power in order to achieve its most desirable outcome in the region? More simply stated: Should the United States invest in or divest from its Arctic policy and efforts?

## **C. LITERATURE REVIEW**

While the Arctic region remains an area of high strategic investment and priority for Russia both economically and militarily, it has yet to fully emerge as a strategic priority for the United States, except in outdated policies.<sup>4</sup> As warmer temperatures cause an abrupt melting of sea ice in the Arctic and exploration activities drastically increase, there is a new interest in this resource-rich area.<sup>5</sup> Despite some level of discussion within

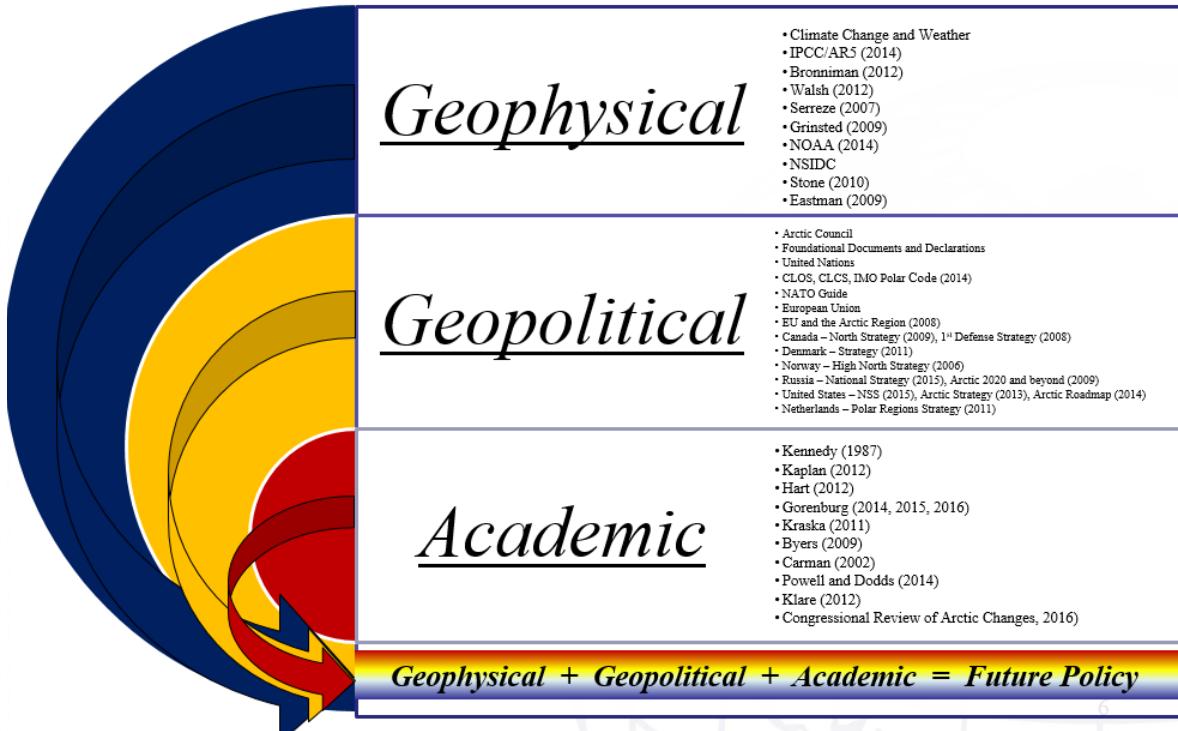
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<sup>4</sup> The White House, “National Strategy for the Arctic Region,” 2009 and November 2013; *National Security Strategy*. Washington, DC: White House, February 2015, February 2015; Ronald O’Rourke, *Changes in the Arctic: Background and Issues for Congress*, Congressional Research Service, October 14, 2016; *The United Nations Convention on the Law of the Sea (A Historical Perspective)*, United Nations Division for Ocean Affairs and the Law of the Sea, Exclusive Economic Zone, 2008; Navy Task Force Climate Change, *U.S. Navy Arctic Roadmap 2014–2030*, February 2014.

<sup>5</sup> Hobart King, “Oil and Natural Gas Resources of the Arctic,” Geology.com, accessed November 29, 2016, [geology.com/articles/arctic-oil-and-gas](http://geology.com/articles/arctic-oil-and-gas).

the Arctic Council, the U.S. and NATO, none of these critical stakeholders have yet to fully resource and execute the strategy outlined in the established policy documents (see Figure 2).<sup>6</sup> Nonetheless, record low amounts of Arctic sea ice over the past decade have shifted global attention to the region and have opened a new dialogue in determining the best way forward utilizing an emerging Arctic (see Figure 2).<sup>7</sup>

Figure 2. Literature Overview



<sup>6</sup> Implementation Plan for the National Strategy for the Arctic Region, January 2014.

<sup>7</sup> King, “Oil and Natural Gas Resources of the Arctic.”

The five Arctic coastal states—the United States, Canada, Russia, Norway and Denmark (Greenland)—are preparing Arctic territorial claims. The abrupt changes surrounding the Arctic will allow increased opportunities for exploration and use of a wide range of resources.<sup>8</sup> Additionally, a year-round ice-free Arctic shipping route will almost certainly cause a paradigm shift in global trading patterns, namely between Europe and China.<sup>9</sup> The second- and third-order effects of such a shift are significant to the global balance and distribution of power from both an economic and a security standpoint.<sup>10</sup>

In his book *The Rise and Fall of the Great Powers*, Paul Kennedy discusses how presence is everything; the fact that Russia has significant advantages in military capability, territory, population and survivability highlights the fact that it holds the greatest leverage against other High North stakeholders.<sup>11</sup> Respected author Robert D. Kaplan asserts in his 2012 book, *The Revenge of Geography*, that the natural conditions of the Arctic have a major impact on its potential for human endeavor, as he studies the positive development potential in parallel with the total lack of development of civilizations and populations in Arctic climates. Kaplan goes on to echo the 2010 works of Stephen Larrabee, who long before the Russian takeover of Crimea made the case that geopolitics had re-emerged in Russia, Ukraine and Eastern Europe.<sup>12</sup> There are very few sources arguing against the growing significance of the Arctic, as globalization and melting ice continue to elevate the importance of the region.

The primary division of Arctic expert schools of thought is between alarmists who believe that melting ice will soon reinvigorate a Cold War-era Arctic, with nuclear

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<sup>8</sup> National Snow and Ice Data Center (NSIDC). “Arctic Sea Ice News and Analysis.” October 15, 2016. <http://nsidc.org/arcticseainews/>.

<sup>9</sup> Jessie Carman, “Economic and Strategic Implications of Ice-Free Arctic Seas,” in *Globalization and Maritime Power*, Sam J. Tangredi (ed) (Washington, DC: National Defense University, 2002), 171.

<sup>10</sup> Ibid., 13.

<sup>11</sup> Paul Kennedy, *The Rise and Fall of the Great Powers: Economic Change and Military Conflict from 1500–2000* (Fontana Press, 1989), 86.

<sup>12</sup> Robert D. Kaplan, *The Revenge of Geography: What the Map Tells Us about Coming Conflicts and the Battle Against Fate* (Random House, 2012), 45–96; Stephen F. Larrabee, “Russia, Ukraine and Central Europe: The Return of Geopolitics,” *Journal of International Affairs* 63, no. 2 (2010).

submarines, intelligence, surveillance and reconnaissance platforms coupled with long-range strategic bombers transiting back and forth between the United States and Russia—along with an increased role for China<sup>13</sup>—and those who view the likely or optimal future of the Arctic as peaceful development that is mutually beneficial to all the Arctic states and the greater world order.<sup>14</sup>

The dovish view is best summarized by Andrew Hart in a 2012 Brookings Institution study in which the researchers argue not only that Arctic development will benefit all stakeholders but also that the increased cooperation and resource incentives in the region will serve to balance global power and as such reduce tensions between the United States and other rising powers, namely China and Russia.<sup>15</sup> While some may find it threatening for Russia to dominate the Arctic, it may be a venue for Russia to serve as a global leader without any increased threat to the United States.<sup>16</sup> The harsh and threatening rhetoric from the Russian government on seizing dominance of the Arctic may be nothing more than Russia's attempt to dominate domestic consumption of resources; in reality, the “Russian government has continually pursued practical cooperative steps with other Arctic states.”<sup>17</sup> These efforts have included attempts to increase economic cooperation while simultaneously solving territorial disputes within the region, without any NATO or Arctic Council involvement.<sup>18</sup> Although Russia views the Arctic as a forum in which to assert its status as a major international power, its primary interest is undoubtedly economic development, which will cost significantly less if done peacefully.<sup>19</sup>

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14 Nele Matz-Luck, “Planting a Flag in Arctic Waters: Russia’s Claim to the North Pole,” *Goettingen Journal of International Law* 1 (2009): 235–255.

14 Bruce Jones, Andrew Hart, and David Steven, “Chill Out: Why Cooperation Is Balancing Conflict among Major Powers in the New Arctic,” Brookings Institution, May 30, 2012.

15 Ibid.

16 Ibid.

17 Dmitry Gorenburg, “Russian Interests and Policies in the Arctic,” War on the Rocks, August 7, 2014, <http://warontherocks.com/2014/08/russian-interests-and-policies-in-the-arctic/>.

18 Ibid.

19 Ibid.

In his 2011 book *Arctic Security in an Age of Climate Change*, James Kraska makes the case that the simple etymology of how key Arctic states refer to the emerging and complex situation may drive how they think about the Arctic and what actions they take. When talking about Arctic *security*, the immediate implications are of appropriate military means to “secure” the interests of the competing states, whereas a simple change to Arctic *stewardship* implies a much more peaceful and cooperative environment, where military buildup and the corresponding escalating tension are not necessities.<sup>20</sup>

The hawkish argument is that despite significant international cooperation on Arctic issues, concerned countries should increasingly view the potential for competing interests and associated resources in the High North as an emerging security issue and ultimately a potential security threat.<sup>21</sup> This stems from the region’s geographic and economic importance combined with the potential military capability states could bring to bear in the High North, which includes permanent basing options, power projection, large-force exercises and the extension of global reach.<sup>22</sup> With the December 31, 2015, release of the Russian National Strategy,<sup>23</sup> and consistent with the EUCOM theater strategy,<sup>24</sup> it became evident that Russia intends to aggressively pursue regional access and resource exploration in the Arctic that could ultimately afford it full and uncontested freedom of maneuver. With 30 percent of the world’s remaining energy resources quickly becoming accessible under melting sea ice, the potential Russian dominance of the Arctic could be viewed as a strategic threat to energy security; Russian control of the remaining energy resources may prove a viable threat to U.S. national security.<sup>25</sup>

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20 James Kraska, ed., *Arctic Security in an Age of Climate Change* (Cambridge University Press, 2011).

21 Carman, “Economic and Strategic Implications,” 178.

22 Ibid.

23 “Russian National Security Strategy,” IEEE, December 31, 2015, <http://www.ieee.es/Galerias/fichero/OtrasPublicaciones/Internacional/2016/Russian-National-Security-Strategy-31Dec2015.pdf>.

24 Phillip M. Breedlove, *United States European Command Theater Strategy*, October 2015, accessed March 20, 2016, [www.eucom.mil/media-library/document/35147/useucom-theater-strategy](http://www.eucom.mil/media-library/document/35147/useucom-theater-strategy).

25 Eric Bonds, “Challenging Global Warming’s New ‘Security Threat’ Status,” *Peace Review* 27, no. 2 (2015): 210.

## D. METHODOLOGY

This thesis uses the Senturion predictive political simulation modeling to develop likely implications and outcomes of various U.S. Arctic policies that might play out over the next 20 years. The policy options assessed include the following:

1. A full U.S. militarization of the Arctic
2. A measurable/modest investment of military assets solely used as an Arctic deterrent
3. A full and complete demilitarization of the Arctic

Senturion fuses advances in computational analytics with subject-matter expert inputs to anticipate political outcomes, providing intelligence analyses in advance. It anticipates the stakeholder interactions that determine political outcomes. Using this baseline, Senturion can identify successful courses of action to shape those outcomes, simulate multiple hypothetical scenarios of interest and identify early warning events and triggers for significant change and follow-on actions.<sup>26</sup> Senturion simulates stakeholders' round-by-round political interactions, animating a graphical representation into a "movie" to show the dynamics of how political interests, decisions and outcomes will likely evolve. Using this baseline to reflect current conditions, analysts can explore implications of different strategies, courses of action and/or policy approaches. Additionally, Senturion can help assess whether and how political outcomes can be shaped in advance for hypothetical scenarios. The baseline assessment, policy shaping and hypothetical scenarios directly address changes concerning the specific issue of interest.<sup>27</sup>

Senturion is well designed to address our research question. The software can model the three hypothetical policy avenues proposed and incorporate the negotiating positions of Arctic stakeholders, namely the U.S. and Russia. The level of stakeholder input can be adjusted based on the varying amounts of leverage and influence garnered through military investment and current and projected posture in the Arctic. By

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<sup>26</sup> "Senturion," Acertas Strategy and Analytics, accessed May 28, 2016, <http://www.acertas-analytics.com/senturion/>.

<sup>27</sup> "Senturion," Acertas Strategy and Analytics, accessed May 28, 2016, <http://www.acertas-analytics.com/senturion/>.

compiling data through research and input from Arctic experts, the research team will populate the model with the best possible data to accurately simulate the balance of power and influence in the Arctic over the next 30 years.

Upon arriving at the results of each of three hypothetical U.S. policies for military investment in the Arctic, the research team will carefully formulate initial findings and likely recommendations. From this information, the team will be able to provide a tangible example of the likely power distribution dynamics of the future Arctic based on the three military policy decisions.

At the completion of research and modeling through Senturion wargaming, the research team will provide a recommendation on the optimal U.S. Arctic policy and posture for military investment and the potential risk and reward of various levels of U.S. military investment in the Arctic.

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## **II. HIGH NORTH KEY FACTORS AND CONSIDERATIONS**

### **A. CLIMATE ADAPTATION AND REMEDIATION**

Borders? I have never seen one, but I heard they exist in the minds of most people.

—Thor Heyerdahl<sup>28</sup>

One does not have to look very deeply into the past two decades of Arctic meteorological data to conclude the High North has undergone some of the most abrupt, nonlinear environmental changes experienced on the planet. Take Greenland as an example—the average annual air temperature has risen over three degrees Celsius relative to the period between 1979 and 2000. Simultaneously, the amount of recorded sea ice in the North Atlantic and Arctic Oceans is now at its lowest level in 10 years.<sup>29</sup> Figure 3 shows the annual warming temperatures over the past 70 years. In addition, Figure 4 depicts a historical comparison between 1984 perennial sea ice (e.g., the portion of ice that survives the summer melt season) and 2016 data.<sup>30</sup>

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<sup>28</sup> Thor Heyerdahl (1914–2002), distinguished research associate of the Climate Change Institute. The University of Maine. Climate Change Institute Pamphlet. Orono, ME: University of Maine, 2016.

<sup>29</sup> Dr. Paul Andrew Mayewski, Director, Climate Change Institute, briefing given to the research team, July 15, 2016.

<sup>30</sup> Brandon Miller, “Amid Higher Global Temperatures, Sea Ice at Record Lows at Poles,” CNN, last modified November 19, 2016, <http://www.cnn.com/2016/11/18/world/sea-ice-arctic-antarctic-lows/index.html>.

Figure 3. Climate Reanalyzer Graph of N. Hemisphere Annual Temperatures<sup>31</sup>

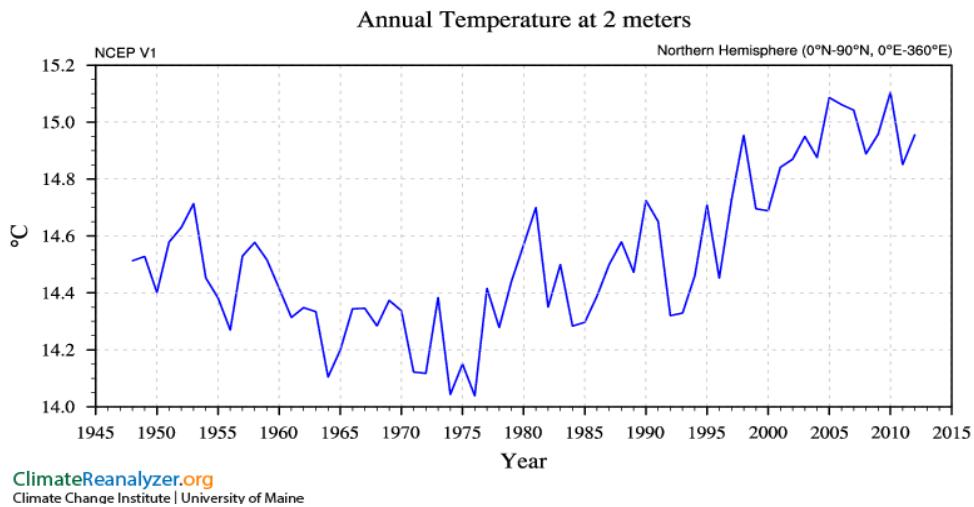
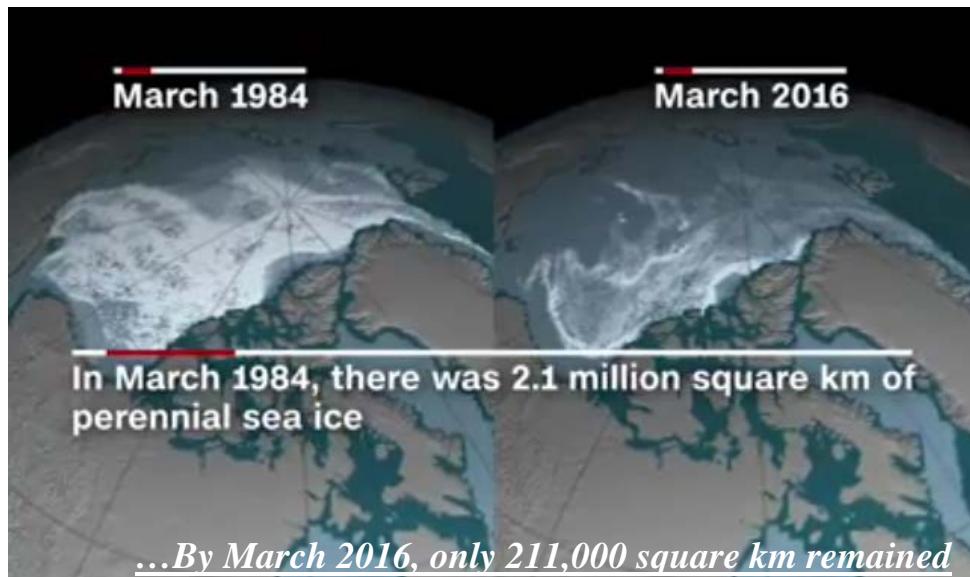


Figure 4. CNN Video Comparison of Arctic Perennial Sea Ice Change between 1984 and 2016<sup>32</sup>



<sup>31</sup> Dr. Paul Andrew Mayewski, Director, Climate Change Institute, briefing given to the research team, July 15, 2016.

<sup>32</sup> Adapted from Miller, "Amid Higher Global Temperatures."

As the temperatures in the High North rise and Arctic sea ice continues to recede, it further highlights not only Arctic accessibility as a security concern but also how the climate exacerbates the associated security implications. In 2013, the chairman of the Arctic Council, Secretary of State John Kerry, noted the significant overlap of the interests of the eight member states and how their decisions “don’t stop at the 66th parallel.” He also mentioned that climate change is the most far-reaching issue in the area, affecting all things, including “our economies, national security and international stability (refer back to Figure 1).”<sup>33</sup>

As the climate continues to adapt and temperatures steadily rise on a global scale based on human actions and interactions, oil, gas and minerals will become easier to obtain. This will bring its own unique set of challenges, including increased pollution in the region and the potential for more mishaps.

## B. SEARCH AND RESCUE

Imagine a near ice-free High North scenario with a sharp increase in commercial traffic using the Northern Sea Route and Northwest Passage. As more and more vessels begin to transit the region, the chance of an oil tanker spilling black oil across a backdrop of white greatly increases. While some have considered this scenario, its implications and the actions it would call for have not been fully analyzed or put into practice. Though the U.S. and Canada have rehearsed associated response options in Arctic waters, the U.S. and Russia have not tested their coordinated responses since the Arctic SAR Agreement was signed in 1989.<sup>34</sup>

While the environmental impacts of a catastrophic oil spill event are undoubtedly high, the ability of the United States to successfully execute search and rescue operations in the region are even more consequential. United States Coast Guard aircraft could take

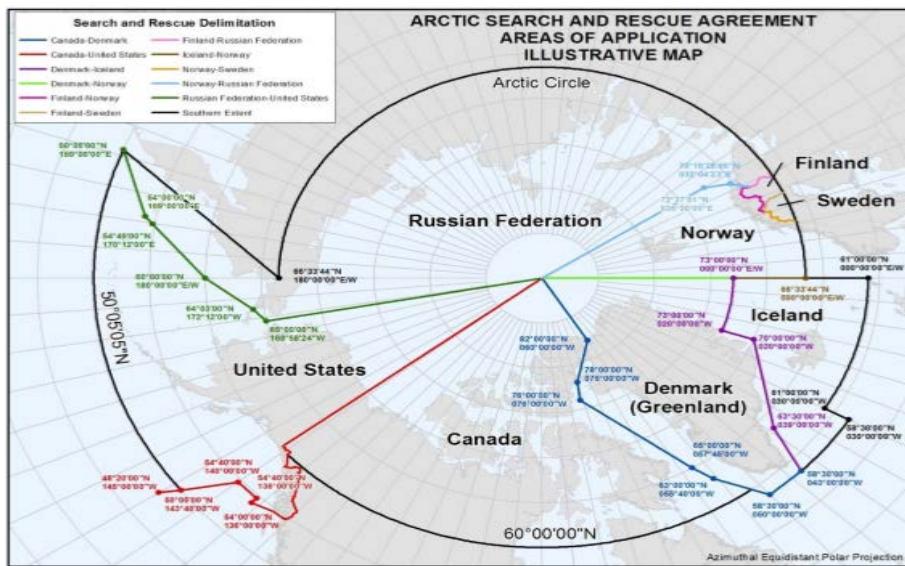
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33 U.S. Secretary of State John Kerry, remarks given at the Arctic Council Ministerial Session, Kiruna, Sweden, May 15, 2013, <http://www.state.gov/secretary/remarks/2013/05/209403.htm>.

34 Text of final version of agreement made ready for signing and dated April 21, 2011, [http://arcticcouncil.org/filearchive/Arctic\\_SAR\\_Agreement\\_EN\\_FINAL\\_for\\_signature\\_21-Apr-2011.pdf](http://arcticcouncil.org/filearchive/Arctic_SAR_Agreement_EN_FINAL_for_signature_21-Apr-2011.pdf). For a State Department fact sheet on the agreement, see “Secretary Clinton Signs the Arctic Search and Rescue Agreement with Other Arctic Nations,” May 12, 2011, <http://www.state.gov/r/pa/prs/ps/2011/05/163285.htm>.

several hours to respond to a crisis, and attempts by associated Coast Guard cutters to respond to a vessel in distress may take days or even weeks.<sup>35</sup> While the Arctic Council came to an agreement on search and rescue borders, that agreement does not take into account the increased frequency of use of the Northern Sea Route and Northwest Passage that is expected in the near future (see boundary delineations, Figure 5). An example proving the increased accessibility is the luxury cruise ship *Crystal Serenity*, which, in a 32-day voyage with over 1,600 crew and passengers onboard, became the first cruise ship to navigate the Northwest Passage in September of 2016. Additionally, the current search and rescue agreement as written puts the costs of executing the agreement on the requesting country and also states that the “implementation of the agreement shall be subject to the availability of relevant resources.”<sup>36</sup>

Figure 5. Arctic Search and Rescue Agreement Areas of Application Boundaries Map<sup>37</sup>



Source: “Arctic Search and Rescue Agreement,” accessed July 7, 2011, at <http://www.arcticportal.org/features/features-of-2011/arctic-search-and-rescue-agreement>.

<sup>35</sup> Coastal Response and Research Center, *Opening the Arctic Seas: Envisioning Disasters and Framing Solutions* (Durham: University of New Hampshire, 2009).

<sup>36</sup> U.S. Department of State, “Maritime Matters: Search and Rescue in the Arctic; Agreement between the United States of America and Other Governments, Annex 12,” Nuuk, May 12, 2011.

<sup>37</sup> Source: “Arctic Search and Rescue Agreement,” accessed July 7, 2011, <http://www.arcticportal.org/features/features-of-2011/arctic-search-and-rescue-agreement>.

### C. POTENTIAL FOR COVERT OR CLANDESTINE OPERATIONS

With the December 31, 2015, release of the Russian National Strategy,<sup>38</sup> and consistent with the EUCOM theater strategy,<sup>39</sup> it is now evident that Russia intends to aggressively pursue regional access and resource exploration in the Arctic that will ultimately afford it full freedom of maneuverability and the potential for uncontested operations in the High North. This presents the following questions: What is the strategic value of the Arctic? Is it truly significant enough to invest military and diplomatic capital into making the United States capable of operating on par with Russia in the Arctic, or is the potential vulnerability in not doing so overstated? Should the U.S. allow other world powers to take the lead in the Arctic and could this ultimately serve the best interest of all stakeholders, or is now the time to introduce covert action options as a distinct capability within the region?

While peaceful development is likely the preferred course of action for many Arctic stakeholders, the potential to act militarily in the region may be increasingly important to maintaining the peace and proving that the U.S. and NATO do in fact have a credible deterrent option in the High North. While the current U.S. military is neither trained nor equipped to conduct sustained operations in the Arctic, a small covert team may be able to influence the region.

As T. E. Lawrence once stated, “The smaller the unit, the better its performance.”<sup>40</sup> This could hold completely true in the Arctic’s harsh environment. Ultimately, strategic utility may be achieved through covert action operations using nongovernmental organizations currently in place in the region. In the Arctic specifically, there would be a heavy dependence on many indigenous personnel and internal organizations, and it would be extremely difficult to conduct operations without leveraging those organizations.

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<sup>38</sup> IEEE, “Russian National Security Strategy,” December 31, 2015, <http://www.ieee.es/Galerias/fichero/OtrasPublicaciones/Internacional/2016/Russian-National-Security-Strategy-31Dec2015.pdf>.

<sup>39</sup> Breedlove, *United States European Command Theater Strategy*.

<sup>40</sup> T. E. Lawrence, *Seven Pillars of Wisdom: A Triumph* (New York: Knopf Doubleday, 1991), 136.

In order to explore the best utility for covert action as an option in the High North, it is important to start with the foundational definition of covert action as given in 50 U.S. Code § 3093:

**“Covert action”** is an activity or activities of the United States Government to influence political, economic, or military conditions abroad, where it is intended that the role of the United States Government will not be apparent or acknowledged publicly, but does not include: (1) activities the primary purpose of which is to acquire intelligence, traditional counterintelligence activities, traditional activities to improve or maintain the operational security of United States Government programs, or administrative activities; (2) traditional diplomatic or military activities or routine support to such activities; (3) traditional law enforcement activities conducted by United States Government law enforcement agencies or routine support to such activities; or (4) activities to provide routine support to the overt activities (other than activities described in (1), (2), or (3)) of other United States Government agencies abroad.<sup>41</sup>

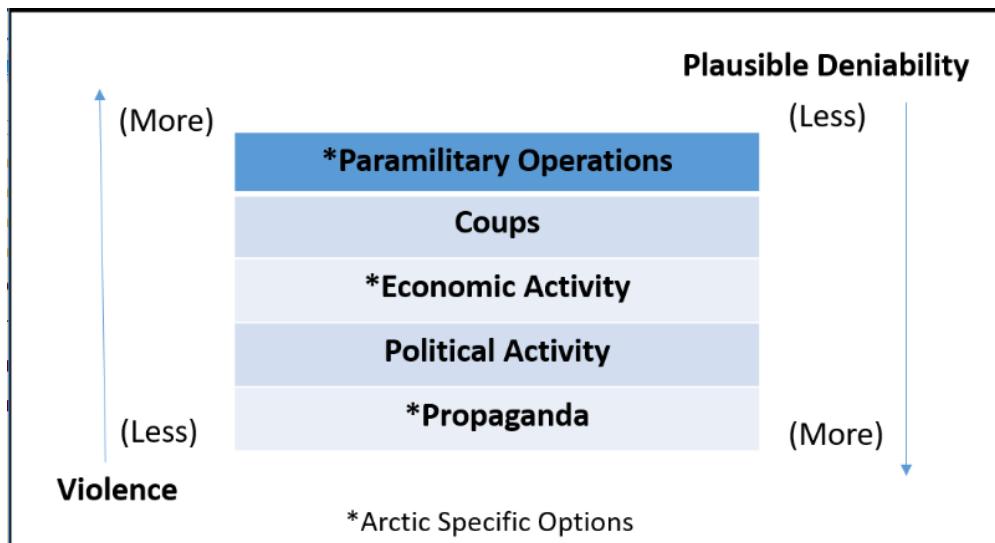
Looking at this definition and pairing it with Mark Lowenthal’s covert action ladder,<sup>42</sup> there are three areas where covert action could have the highest strategic utility. In this modified three-step covert action ladder for the Arctic, the primary vehicles of influence would be propaganda, economic activity and paramilitary operations. These three do not discount the others; however, they stand out as the immediate tools that could be invoked, reducing the steps from five to three (see Figure 6).

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<sup>41</sup> Title 50 U.S. Code § 3093, 1947, Section E.

<sup>42</sup> Mark Lowenthal, *Intelligence: From Secrets to Policy*, 2nd Ed. (Washington, DC: CQ Press, 2003).

Figure 6. Modified Covert Action Ladder for the Arctic High North<sup>43</sup>



Although the Arctic region does not have an abundance of human inhabitants, covert propaganda could still be a viable tool to cast Russian expansionism into the Arctic in a negative light, highlighting it as threatening to a host of countries and posing a detriment to the global environment. Anti-Russian-expansionist propaganda could be covertly distributed by the admittedly small populous of approximately 2,000 people on the island of Svalbard, which is Norwegian property although one third of its inhabitants are Russian citizens. Svalbard could be a key island of influence from a propaganda standpoint that would help shape the conditions should further escalation be warranted.

Secondly, with the vast untapped resources in the Arctic region, there is an opportunity to exploit Russian exploration activities from an economic standpoint by coupling those activities with the aforementioned propaganda efforts. Covert actions in the High North could be designed to force an overinvestment of Russian resources, causing a slow depletion that would hinder Russian actions over the long term. Additionally, covert actions executed elsewhere across the globe could potentially force

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<sup>43</sup> Adapted from Lowenthal. *Intelligence* Modified to place greater emphasis on the three elements of paramilitary operations, economic activity and propaganda as geared primarily toward the Arctic and potentially to serve as the primary means of covert action operations as opposed to the five outlined by Lowenthal.

Russia into an economic reprioritization, leaving the Arctic available to others who would be afforded an equal share.

Lastly, covert action using paramilitary operations could be a means to disable critical infrastructure. This could in fact be the highest area of strategic payoff in the region. Such operations could function much like actions executed under the codename “Olympic Games,” in which many high-level national organizations in the United States allegedly worked together to develop a first-use cyber-attack capability intended to impose long-term damage on the Natanz nuclear production facility and other Iranian nuclear enrichment facilities. Only the top officials in the United States intelligence community, military services and the White House knew the details behind the creation and implementation of the Stuxnet cyber-attack weapon.<sup>44</sup> A similar type of capability could be used to impact Russian oil production facilities, causing a slow drain on Russian finances by forcing a reinvestment to fix components that are failing much more quickly than expected at any given oil refinery. Additionally, paramilitary operations could begin causing “unknown fires or explosions” at Arctic-based Russian facilities or bases to discredit Russian capabilities in the Arctic region.

Through the lens of an operational prioritized approach, the target location in this case proves the most critical element. The Arctic, by and large, truly is uncharted territory. This means there is a lack of intelligence surveillance and reconnaissance in the region, and U.S./NATO personnel as a whole do not organize or train to engage in operational Arctic conditions, nor are they suitably equipped. While there is no known covert action history in the area, elements of previous actions could be adopted (i.e., broadcasts, publications, etc.), although the target audience is minimal. The priority area to assess in order to reap the greatest strategic utility lies in the realm of economics. If covert propaganda is devised to promote the narrative that Russia is viewed across the international stage as a “poor steward” of the region with the sole intention of advancing its own economic and military capabilities in order to encroach upon other states, the covert action would be deemed successful. If warranted, covert action in the Artic similar

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<sup>44</sup> David E. Sanger, *Confront and Conceal: Obama’s Secret Wars and Surprising Use of American Power* (New York: Crown, 2012), 188.

to Stuxnet could be an efficient, cost-effective and low-risk method of countering Russian military policy and economic advancement in the region.

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### **III. SENTURION PREDICTIVE POLITICAL SIMULATION MODEL**

#### **A. SENTURION OVERVIEW**

Senturion is a predictive analysis software tool that supports and guides decision makers in collecting and organizing data, anticipating others' next moves and planning appropriate responses. Senturion forecasts stakeholder behavior using simulation software. It empowers analysts and decision makers to anticipate complex human behaviors and simulate, with a high degree of reliability, the behavior of closed regimes and cross-national networks. These simulations can be used to examine the performance of the subject stakeholders in various scenarios, create additional understanding of the processes at work, forecast decision outcomes and predict behavior of group members under varying conditions.<sup>45</sup>

The U.S. State Department finds “of the various models tested by the Bureau, Senturion performed with the highest level of accuracy and granularity at over 90% for baseline projections,” and “declassified evaluations by the U.S. intelligence community find analyst and expert predictions are right less than 50% of the time in complex scenarios, but ACERTAS’ [Senturion creator] approach is accurate above 85% of the time.”<sup>46</sup> As early as 2002, the U.S. Department of Defense was testing applications of the software on complex problems in the defense sector, and in 2006, researchers at the National Defense University tested the accuracy of the program by analyzing three cases in which it was employed during unfolding events: the stabilization and reconstruction phase of Operation Iraqi Freedom (OIF), the run-up to the Iraqi elections in January 2005 and the leadership transition in Palestine following the death of Yasser Arafat.<sup>47</sup> The researchers concluded that “each project tracked well with reality, often

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<sup>45</sup> Senturion Forecasting LLC, *Senturion Analyst Guide Government*, Version 5.2 (New York: Senturion Forecasting LLC), 5.

<sup>46</sup> “Senturion,” Acertas Strategy and Analytics, <http://www.acertas-analytics.com/senturion/>, accessed May 18, 2016.

<sup>47</sup> Mark Abdollahian et al., “Senturion: A Predictive Political Simulation Model,” Defense and Technology Paper, Center for Technology and National Security Policy, National Defense University, 2006, 1.

providing counterintuitive results,” and that Senturion was indeed a viable tool for predicting complex political outcomes.<sup>48</sup>

Senturion’s technological foundation incorporates leading-edge economic models derived from game theory, decision theory, spatial bargaining models and risk management. Each of these approaches addresses specific aspects of the predictive analytical process.<sup>49</sup> Senturion has integrated the most powerful aspects of each of these models into an agent-based analytical methodology.

A “snapshot” of the political landscape in the form of relative importance and influence scores by stakeholders is all the data that is required to begin predictive analysis modeling with Senturion. As stated in the Senturion program manual, “Building on the requisite data, Senturion combines elements of the key microeconomic theories into a single set of algorithms that predict the evolution of the political landscape over time through accurate and systematic analysis.”<sup>50</sup>

With a basic understanding of Senturion’s capabilities and limitations, we hypothesized that it had great potential to aid our research effort by providing predictive analysis of the evolving political landscape of the emerging High North and what it may look like in the distant future based on the current snapshot of stakeholders. Therefore, the next research step was to gather and interpret available data to determine the most accurate snapshot of the current High North situation.

## B. DETERMINING INITIAL DATA SET

The purpose of this section is to explain the process that was used to translate mostly qualitative underlying data into numbers on a zero to 100 scale for input into the Senturion software. An inherent limitation of the software is that all factors must be distilled into relative numbers on a scale; each stakeholder has a numerical score for the relative importance of the issue to them and a numerical score for the relative influence the stakeholder has on the issue compared to the other stakeholders. As a check to this

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<sup>48</sup> Ibid., 19.

<sup>49</sup> Senturion Forecasting LLC, Senturion Analyst Guide Government Version 5.2, 6.

<sup>50</sup> Ibid., 7.

potential vulnerability, Senturion incorporates robustness testing, which is a method to determine how much variability in the initial input data influences the outcome of the model, if at all. In order to model the issue of Arctic control and influence as accurately as possible, we researched what available data could logically support the model. The first area to be determined was importance.

### **1. Importance**

Senturion describes importance as the ranking of this particular issue relative to everything else the stakeholder addresses.<sup>51</sup> In attempting to decipher what importance the Arctic holds on a relative scale for each stakeholder to be modeled, we first researched each stakeholder's overarching national security strategy document and recorded how many times and to what extent it makes mention of the Arctic, and then whether the stakeholder nation has a specific, separate Arctic policy document. Without knowing the inner thoughts of the leadership of these nations, the publicly published policies on the Arctic are the most reliable indicators of intent available for the model.

The next data point used was the percent of gross domestic product derived from the Arctic by each stakeholder nation. Due to the fact that most national interest in the Arctic stems from potential or realized economic benefits, this element is vital to determining what importance the Arctic truly plays for each state. Once the data was compiled, the stakeholders were ranked according to importance, and then using this data and the input of several subject-matter experts, a relative score for each stakeholder was created on the zero to 100 scale.

### **2. Influence**

Senturion describes influence as relative ranking of potential to affect the issue outcome.<sup>52</sup> Influence is best thought of as the total weight or value the stakeholder would have if all their time, energy and resources were devoted to the issue at hand.<sup>53</sup> Using a

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<sup>51</sup> Ibid., 11.

<sup>52</sup> Ibid.

<sup>53</sup> Ibid., 23.

similar process to how importance was determined, and because our research question was primarily focused on the military aspect of the future High North, we decided to look at the military and physical realms to determine the relative influence of the Arctic stakeholders. We considered some economic measures such as Arctic gross regional production, but we determined that military assets and capabilities and physical territory were the best measures of potential to influence the Arctic.

The Arctic environment is naturally difficult to access. Therefore, the mere capability to gain physical access to the area and sustain any type of element there has a much greater effect on ability to influence the region than it does for any other region of the Earth. Almost all physical Arctic access is facilitated by the military assets of each stakeholder nation. The measure of physical territory of each nation within the Arctic was also deemed significant, due to the possibility of basing and sustaining military and commercial ventures, the ability to shorten or maintain lines of communication in a military conflict and perceptions of legitimacy in the international community and among indigenous Arctic populations.

We researched the Arctic military assets and capabilities of each stakeholder nation and categorized them by air, land and sea (see the Appendix). Additional weight was given to influence scores for assets specifically designed for operation in the Arctic versus those which are merely able to “survive” for short periods of time in Arctic conditions and with elevated risk. Icebreaking ships were also deemed critical to the influence score of each stakeholder, due to their ability to create Arctic access for any venture, military, commercial, scientific or otherwise. Even in a significantly warmer Arctic climate, persistent sea ice and low temperatures will continue to be a threat to surface ships, and the requirements to sustain surface ships in this climate will be significant and challenging. A surface naval vessel following an icebreaking ship is canalized to a very narrow path and unable to maneuver as designed. “Personnel require additional protective equipment, while ships and aircraft require additional heating

elements to keep their temperature at a suitable level for operations and to prevent sea spray from freezing on the ship and causing substantial ice build-up.”<sup>54</sup>

Another important factor to consider when determining influence values and associated Senturion influence scores is submarines and undersea warfare. In an escalation to a military conflict, the submarine could be the primary tool of dominance in the Arctic region. Shy of an all-out hot war, however, the effects of the submarine are negligible, and each stakeholder’s capabilities are relatively balanced. Of the four Arctic States which operate submarines, only Russia and the United States have significant enough fleets and capabilities to tangibly influence the balance of military power in the Arctic. Other than Russia using a submarine to plant a flag on the floor of the North Pole in 2007 to signify “the Arctic is ours,” there has not been much real-world submarine usage aside from transient passages.<sup>55</sup> In terms of a prewar, irregular or hybrid conflict without openly declared hostilities, the submarine’s ability to support humanitarian operations, oil spill eradication, environmental catastrophes, search and rescue and tourism is negligible. In this context, surface vessels and air and land units warrant a higher influence weight due to their leveraging potential across the more likely scenarios. Nuclear-powered fast attack submarines will always be welcomed under the ice and Arctic Sea to ensure a capable force is ready to ensure maritime control; however, for the likely Arctic scenarios short of conventional war, the submarine is weighted in the influence scores for its deterrent effect—U.S. and Russian submarines deter one another from initiating a conventional war in the Arctic and potentially have a stabilizing effect across the region.<sup>56</sup>

After compiling the assets and capabilities of each Arctic stakeholder and factoring in the percentage of Arctic territory owned by each, we compared and contrasted the stakeholders to determine the relative influence scores from zero to 100 for input into the Senturion software.

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<sup>54</sup> Stein, *The Submarine*, 10.

<sup>55</sup> Mark Galeotti, “Cold Calling – Competition Heats Up for Arctic Resources” Jane’s Intelligence Review, 18 September 2008

<sup>56</sup> Jan Joel Andersson, “The Race to the Bottom: Submarine Proliferation and International Security,” *Naval War College Review* 68, no. 1 (2015): 12.

## C. STAKEHOLDER BACKGROUND

As listed earlier, there are eight nations that own physical territory within the Arctic Circle: the United States, Russia, Canada, Norway, Denmark (Greenland), Iceland, Finland and Sweden. This section will briefly describe each group's Arctic positioning with respect to policy and economy and military capability, along with corresponding relative importance and influence scores derived for building the “base case” Senturion model for the issues of the High North.

### 1. United States

The 2015 United States National Security Strategy makes three off-handed references to the Arctic and contains no specific policy statement concerning the region.<sup>57</sup> The U.S. does have a specific Arctic policy document titled “National Strategy for the Arctic Region,” published in May of 2013, which is a direct regurgitation of President Bush’s 2009 Arctic policy with a new signature from President Obama.<sup>58</sup> The three published objectives of the United States in the Arctic are to: “(1) facilitate safe, secure and reliable navigation, which depends on reliable infrastructure to support shipping activities in cooperation with other nations; (2) protect maritime commerce; and (3) protect the Arctic environment through a risk-based capability to address environmental hazards.”<sup>59</sup> Although it owns 10 percent of Arctic territory and produces 13 percent of Arctic gross regional product, the United States currently derives less than one percent of its gross domestic product from the region.<sup>60</sup>

Militarily, the United States has significant air assets and capabilities as well as basing in the Arctic compared to other stakeholders; however, it lacks ground and sea capability.<sup>61</sup> The United States does not have any specialized or dedicated Arctic ground units, only a handful of light infantry brigades with limited cold-weather and/or

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<sup>57</sup> White House, *National Security Strategy*.

<sup>58</sup> White House, “National Strategy for the Arctic Region.”

<sup>59</sup> Ibid.

<sup>60</sup> See Appendix.

<sup>61</sup> See Appendix.

mountaineering training, and while all U.S. Navy vessels are “Arctic capable” on a limited basis, none are specifically designed to operate continuously in the Arctic. The United States owns two heavy icebreaking ships, both of which are at the end of their lifespans and only one of which is routinely operational.<sup>62</sup> A military strength for the United States is its submarine capabilities. While the number and type of U.S. submarines operating in the Arctic is not readily available information due to operational security and classification, the general composition of the United States submarine fleet is the largest and most capable in the world. Since 1958, in the Arctic, the U.S. Navy’s submarine has continued to deliver “a set of tools and capabilities to United States national security that are unique and indispensable, enabled by stealth, surprise and boldness while simultaneously providing military impact and deterrent influence far out of proportion to their size and quantity.”<sup>63</sup> The U.S. operates 14 SSBN nuclear-powered ballistic missile submarines, four SSGN nuclear-powered guided missile submarines, and 53 SSN nuclear-powered general-purpose submarines.<sup>64</sup> The SSBNs serve primarily as the third leg of the United States “nuclear triad” and serve no role in a potential regional Arctic conflict. The SSGNs could have a significant impact in an irregular Arctic conflict, because they are capable of carrying up to 70 Tomahawk cruise missiles or four Navy SEAL platoons with undersea vehicles for infiltrating or recovering small special operations forces.<sup>65</sup> The United States SSNs are primarily employed in antiship and antisubmarine “fast attack” roles and would be critical in a conventional military conflict in the Arctic. Submarines being accounted for, the lack of ground and surface naval capabilities is still a significant shortcoming compared to Russian and Canadian Arctic capabilities in these domains.

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<sup>62</sup> Mihaela David, “Strong Foothold or on Thin Ice? U.S. Strategies for Development, Environmental Stewardship, and Security in the Arctic,” in *Governing the North American Arctic*, eds. Dawn Alexandrea Berry, Nigel Bowles, and Halbert Jones (Palgrave Macmillan UK, 2016), 122–142.

<sup>63</sup> Commander Submarine Forces, Undersea Warfighting, July 2011,  
<http://www.public.navy.mil/subfor/hq/PDF/Undersea%20Warfighting.pdf>, 2.

<sup>64</sup> See Appendix.

<sup>65</sup> Jan Joel Andersson, “The Race to the Bottom: Submarine Proliferation and International Security.” *Naval War College Review* 68, no. 1 (2015): 17–18.

Analyzing this data in comparison to the other Arctic stakeholders, the United States was assigned a relative importance value of 25 and an influence value of 40 for the purpose of Senturion modeling.

## 2. Russia

The 2015 Russian National Security Strategy contains three specific bullets highlighting initiatives for the Arctic.<sup>66</sup> The 2009 “Russian Federation Policy for the Arctic to 2020” serves as the Russian Arctic policy document, and it contains four specific policy objectives: “(a) use of the Arctic zone belonging to the Russian Federation as a strategic resource base providing the solution to problems of social and economic development in the country; (b) maintenance of the Arctic as a zone of peace and cooperation; (c) preservation of the Arctic’s unique ecological systems; and (d) use of the Northern Sea Route as a national single transport communication of the Russian Federation in the Arctic.”<sup>67</sup> Russia owns 53 percent of the Arctic region, produces 70 percent of the Arctic gross regional product and derives 16 percent of its gross domestic product from the Arctic.<sup>68</sup>

Russia has positioned itself as the dominant military force in the Arctic region.<sup>69</sup> In the air, it has over 100 Tu-22 long-range bomber aircraft capable of reaching anywhere in the Arctic, 100 II-38 maritime recon aircraft and numerous other advanced radar and missile capabilities. For ground and maritime operations, Russia has both navy and army specialized Arctic brigades, as well as two Arctic special forces brigades based on the Kola Peninsula. The Russian Northern Fleet is stationed at several large naval and air bases on the Kola Peninsula and is composed of a myriad of Arctic “hardened” surface ships. The Russian Navy operates six heavy icebreakers, which are nuclear powered and heavily armed. An estimated fleet of 40 various-sized icebreakers is available for contract by private Russian companies. The known Russian submarine fleet consists of 11 SSBN

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<sup>66</sup> “Russian National Security Strategy.”

<sup>67</sup> “Russian Federation’s Policy for the Arctic to 2020,” September 18, 2008, <http://www.arctis-search.com/Russian+Federation+Policy+for+the+Arctic+to+2020>.

<sup>68</sup> See Appendix.

<sup>69</sup> See Appendix.

nuclear-powered ballistic missile submarines, eight SSGN nuclear-powered guided missile submarines, 17 SSN nuclear-powered general-purpose submarines, and 20 SSK Kilo-class diesel-electric-powered attack submarines.<sup>70</sup> While the overall numbers of Russian submarines are slightly lower than the United States' submarine fleet, the capabilities and roles across the SSBN, SSGN and SSN are roughly equivalent.<sup>71</sup> The Russian Kilo-class submarines are used in a tactical anti-ship and anti-submarine role and have limited range and duration when compared to the nuclear-powered submarines.<sup>72</sup>

Although the Arctic takes up a moderate portion of Russian political attention, other pressing foreign policy issues such as Ukraine and Syria seriously divide its attention and ultimately give Russia a relative importance score of 35. Due to its physical and military dominance of the Arctic, Russia is evaluated as having a relative influence score of 100.

### 3. Canada

Canada's national security document "Securing an Open Society: Canada's National Security Policy" does not address specific geographic areas, but Canada does have an Arctic policy, which states that Canada's Arctic objectives are to "exercise sovereignty, promote economic and social development, protect Canadian environmental heritage and improve and devolve northern governance."<sup>73</sup> Canada possesses 23 percent of the Arctic territory—including the Northwest Passage, a soon-to-be-vital commercial shipping lane—but currently only makes two percent of its GDP from that land.<sup>74</sup>

Canada is soundly prepared to conduct defensive military operations in its Arctic territory, though not on the scale of Russia.<sup>75</sup> Canada's most remarkable air capability is its integrated network of persistent intelligence, surveillance and reconnaissance (ISR)

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<sup>70</sup> See Appendix.

<sup>71</sup> Jan Joel Andersson, "The Race to the Bottom: Submarine Proliferation and International Security." *Naval War College Review* 68, no. 1 (2015): 17–18.

<sup>72</sup> Ibid., 18.

<sup>73</sup> See Appendix.

<sup>74</sup> See Appendix.

<sup>75</sup> See Appendix.

nodes within the region. This includes 18 antisubmarine warfare aircraft, six joint uninhabited surveillance and target-acquisition unmanned aerial vehicles, air and underwater surveillance radars, “Polar Epsilon” observation satellites and eighty F/A-18 combat aircraft with tanker support to increase range and station time across the High North. On the ground, Canada trains and maintains a 500-man Arctic army battalion at its Arctic training base in Resolute Bay, Nunavut, and a 5,000-strong Canadian Ranger paramilitary force, comprising mostly indigenous populations, which serve as a major ISR asset across Canada’s vast northern territory. The Canadian Navy has 15 surface warships and four conventional submarines, none of which are ice strengthened or capable of operating under ice, and a fleet of five heavy icebreakers, which are only capable of operating during the summer months. Its four Victoria-class submarines are limited to monitoring underwater traffic at key choke points such as the Northwest Passage, and generally only one of four submarines are operational at any given time due to maintenance and crew training shortfalls.<sup>76</sup>

Due to the economic potential of large-scale commercial shipping and resource exploitation emerging from the melting Arctic, Canada is assigned an importance score of 85 for modeling. Because of its military preparedness and possession of almost a quarter of the Arctic territory with well-established military basing and transportation, Canada is given a relative influence score of 60.

#### **4. Norway**

Norway currently derives seven percent of its GDP from the Arctic, a percentage that is growing steadily with the melting ice and emerging resources.<sup>77</sup> It is for this reason that Norwegian prime minister Erna Solberg wrote in November, 2014, that “the Arctic is Norway’s most important foreign policy priority.”<sup>78</sup> In the same document, Norway outlines six Arctic policy objectives: (1) that the Arctic continues to be stable,

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<sup>76</sup> Phil Webster, “Arctic Sovereignty, Submarine Operations and Water Space Management.” *Canadian Naval Review* 3, no. 3 (2007): 14–16.

<sup>77</sup> See Appendix.

<sup>78</sup> Norwegian Ministry of Foreign Affairs, “Norway’s Arctic Policy,” November 2014, 3, [https://www.regjeringen.no/globalassets/departementene/ud/vedlegg/nord/nordkloden\\_en.pdf](https://www.regjeringen.no/globalassets/departementene/ud/vedlegg/nord/nordkloden_en.pdf).

peaceful and predictable; (2) international cooperation; (3) business development; (4) knowledge development; (5) infrastructure; and (6) environmental protection and emergency preparedness.<sup>79</sup>

The Norwegian military posture toward the Arctic is less robust compared to the other stakeholders, counteracted only partially by strong Norwegian diplomatic prowess where the region is concerned. Almost all Norwegian military assets are aligned toward a defensive posture. Norway possesses six unarmed maritime patrol aircraft and 60 F-16 combat aircraft, all of which have very limited range outside of the Norwegian Arctic and require modernization.<sup>80</sup> Norwegian Army “Brigade Nord” consists of two heavy mechanized infantry battalions, which are “winter trained” but only equipped for operations on the Norwegian mainland. The Norwegian Navy is capable of limited Arctic patrolling with five Arctic-capable but not ice-strengthened frigates and six Ula-class submarines.

Considering the focus of the Norwegian government on the High North and Norway’s ability to achieve diplomatic agreements and victories regarding the region, it is assigned a relative importance score of 100. With very limited military and transport capability within the larger Arctic region, we have given Norway a relative influence score of 25.

## 5. Denmark

Denmark is considered an Arctic nation and stakeholder because of its possession of Greenland. According to the primary Danish national security document, the *Danish Defence Agreement 2013–2017*, the Arctic is a major component of the Danish number-one priority of “home defense,” and it receives 46 other mentions throughout the document.<sup>81</sup> The *Kingdom of Denmark Strategy for the Arctic 2011–2020* lists Danish objectives within the Arctic as “a peaceful, secure and safe Arctic; with self-sustaining

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<sup>79</sup> Ibid., 8–20.

<sup>80</sup> See Appendix.

<sup>81</sup> *Danish Defence Agreement 2013–2017*, Copenhagen, November 30, 2012, <http://www.fmn.dk/eng/allabout/Documents/TheDanishDefenceAgreement2013-2017english-version.pdf>.

growth and development; with respect for the Arctic’s fragile climate, environment and nature; in close cooperation with our international partners.”<sup>82</sup>

Denmark currently derives four percent of its GDP from the Arctic, but that figure is anticipated to grow dramatically as the Greenland ice sheet continues to melt, granting access to massive mineral resources and fertile agricultural land within Greenland.<sup>83</sup> Greenland gives Denmark a substantial 12 percent territorial possession of the Arctic region.<sup>84</sup>

Denmark is the weakest influencer of the five Arctic nations due to its distance from the actual Arctic region and lack of assets to operate within it. It has no air assets dedicated to the Arctic; its land forces are limited to a small paramilitary Slaedepatrulje Sirius (sled patrol) force on Greenland and a small special forces unit known as the Fromadskorps (“Frogman Corps”) capable of operating within Greenland. There is a Danish Navy base at Kangilinnguit, Greenland, and the Royal Danish Navy has five Arctic-capable but not ice-strengthened frigates and one ice-strengthened large patrol craft, which is heavily armed.<sup>85</sup> We have assessed Denmark with a relative importance score of 95 due to the magnitude of Greenland and its potential and a relative influence score of 15 due to a lack of capability to operate in the Arctic.

## 6. Iceland

Iceland’s Arctic policy describes 12 principles, which include “securing Iceland’s position as a coastal state within the Arctic region; building on agreements and promoting cooperation with other states and stakeholders on issues relating to Icelandic interests in the Arctic region; safeguarding broadly defined security interests in the Arctic region through civilian means and working against any kind of militarization of the Arctic; and

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<sup>82</sup> *Kingdom of Denmark Strategy for the Arctic 2011–2020*, August 2011, [http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwjhy9iNr-fOAhUG4mMKHRPICEsQFggcMAA&url=http%3A%2F%2Fusa.um.dk%2Fen%2F~%2Fmedia%2FUSA%2FWashington%2FArctic\\_strategy.pdf](http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwjhy9iNr-fOAhUG4mMKHRPICEsQFggcMAA&url=http%3A%2F%2Fusa.um.dk%2Fen%2F~%2Fmedia%2FUSA%2FWashington%2FArctic_strategy.pdf).

<sup>83</sup> James Astill, “The Melting North,” *Economist*, June 16, 2012.

<sup>84</sup> See Appendix.

<sup>85</sup> See Appendix.

developing further trade relations between states in the Arctic.”<sup>86</sup> Interestingly, only a tiny offshore Icelandic island is geographically located within the Arctic Circle; however, all of Iceland’s GDP is derived from the greater High North, and the Icelandic government is clearly jockeying to claim its stake and relevance within the region.<sup>87</sup>

Iceland maintains virtually no military and relies heavily on its NATO allies to assist it in defense. It possesses no native air or land assets other than a state police, and its main sea asset is the Icelandic Coast Guard, which is limited to surveilling Iceland’s exclusive economic zones and territorial waters. Due to its reliance on the Arctic for fisheries and maritime commercial production, Iceland is rated with a relative importance score of 100. Due to its complete lack of ability to project power, minimal self-defense, and minimal territory and population, its relative influence score is 10.

## 7. Finland

Finland’s 2015 “Strategic Priorities of the Foreign Service” characterizes the nation as “active in making effective use of the Arctic region” and states that it “advocates for the development of Arctic cooperation.”<sup>88</sup> It has a robust Arctic strategy document published in 2013, which describes a multitude of objectives aligned with the vision of Finland as “an active Arctic actor with the ability to reconcile the limitations imposed and business opportunities provided by the Arctic environment in a sustainable

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<sup>86</sup> “A Parliamentary Resolution on Iceland’s Arctic Policy,” March 28, 2011, <https://www.mfa.is/media/nordurlandaskrifstofa/A-Parliamentary-Resolution-on-ICE-Arctic-Policy-approved-by-Althingi.pdf>.

<sup>87</sup> There is significant debate regarding the seemingly interchangeable nomenclature the “Arctic” and the “High North.” The term “Arctic” denotes only the territory geographically located within the Arctic Circle; this may be too myopic when considering the larger regional implications of trade, resources and international diplomacy. For this reason, many experts encourage using “High North” to more accurately depict the evolving dynamics. For example, the state of Maine, which lies thousands of miles from the geographical Arctic, is already seeing increased commercial business and recognizes immense economic opportunity emerging as a result of climate change.

<sup>88</sup> “The Strategic Priorities of the Foreign Service,” September 17, 2015, <http://formin.finland.fi/public/download.aspx?ID=149755&GUID={D1BD1A51-D435-45F1-99BE-2DB9BCC4DD23}>.

manner while relying on international cooperation.”<sup>89</sup> Although it owns only one percent of the Arctic territory, Finland makes more than 12 percent of its GDP from the Arctic.<sup>90</sup>

The Finnish Jaeger Brigade is a special operations unit which specializes in polar warfare and is capable of conducting a broad range of missions in the Arctic environment; it is supported by limited air and maritime transportation methods out of northern Finland.<sup>91</sup> We have rated Finland with a relative importance score of 40 due to its preoccupation with Russia and other Baltic-based issues in its foreign policy dealings. Due to its specialized but limited capability and relatively strong bilateral and multilateral diplomatic relations with other Arctic nations, we have given Finland a relative influence score of 25.

## 8. Sweden

The most current Swedish national security document, “Swedish National Security: Challenges and Opportunities beyond 2014,” makes four references to the Arctic and notes that “the Arctic or Barents region is attracting increasing and important attention in global security policies.”<sup>92</sup> Sweden has published an Arctic policy with six objectives focused on cooperation at various levels between stakeholders such as the Arctic Council and the European Union.<sup>93</sup> Sweden owns approximately one percent of Arctic territory and gains seven percent of its GDP from the Arctic.<sup>94</sup>

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<sup>89</sup> Prime Minister’s Office, Finland, “Finland’s Strategy for the Arctic Region 2013,” August 23, 2013, <http://vnk.fi/documents/10616/334509/Arktinen+strategia+2013+en.pdf/6b6fb723-40ec-4c17-b286-5b5910fbcf4>.

<sup>90</sup> Ilmo Mäenpää, “Comparative Analysis of Arctic Economies at Macro Level,” in *The Economy of the North*, ed. Solveig Glomsrød and Iulie Aslaksen (Statistics Norway, 2009).

<sup>91</sup> Trefor Moss, “Frosty Relations- Arctic,” *World Policy Journal*, no. 68, accessed July 28, 2016, [http://www.worldpolicy.org/sites/default/files/uploaded/image/68\\_a\\_briefing\\_defence.pdf](http://www.worldpolicy.org/sites/default/files/uploaded/image/68_a_briefing_defence.pdf), 74–75.

<sup>92</sup> Sven-Christer Nilsson and Göran Larsbrink, *Swedish National Security: Challenges and Opportunities beyond 2014* (Stockholm: Royal Swedish Academy of War Sciences, 2013), [http://kkrrva.se/for-sveriges-sakerhet/6\\_swedish\\_national\\_security.pdf](http://kkrrva.se/for-sveriges-sakerhet/6_swedish_national_security.pdf).

<sup>93</sup> Government Offices of Sweden, *Sweden’s Strategy for the Arctic Region*, <http://www.openaid.se/wp-content/uploads/2014/04/Sweden’s-Strategy-for-the-Arctic-Region.pdf>, downloaded July 29, 2016.

<sup>94</sup> See Appendix.

The Swedish Air Force operates Gripen fighters from its Arctic air base at Luleå. For its land component, the Swedish military has the Armed Forces Winter Unit, also known as the Norrbotten Regiment, which is an Arctic-armored light infantry and ranger regiment capable of conducting a diverse set of missions in the Arctic climate.<sup>95</sup> Despite its Arctic basing and prowess in Arctic tactics, the Swedish military is dwarfed in size by Russia and is focused almost exclusively on the Russian threat to the Swedish homeland; it would have a difficult time projecting power in the Arctic. For the initial model, we have assigned Sweden a relative importance score of 30 and a relative influence score of 15.

Having derived appropriate data and scores with which to populate the Senturion model, in the next chapter we will analyze the output of the “base case” Senturion model of the current dynamics of Arctic control. From that point, we will adjust the resource investment and corresponding relative influence level of the United States to model alternative outcomes, and we will explore some manual iterations of the model to attempt to identify opportunities and beneficial bilateral or multilateral High North partners for the United States.

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<sup>95</sup> Moss, “Frosty Relations- Arctic,” 74–75.

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## **IV. SENTURION MODELING RESULTS**

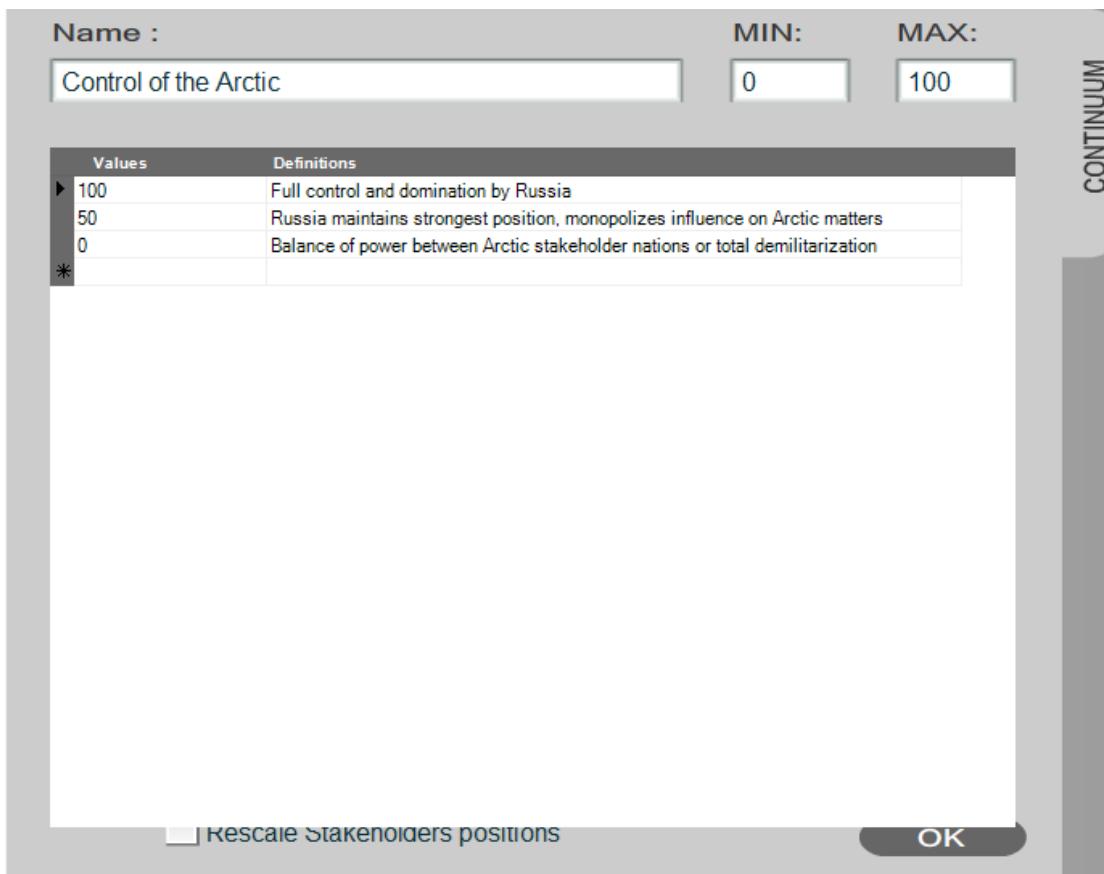
The first scenario modeled is the Arctic “base case,” which will establish a baseline projection of Arctic geopolitics if all stakeholders stay on their current course with respect to policy, capability and importance. After a detailed examination of the base case output and how it was analyzed by the research team, this thesis will next explore five alternate scenarios. These scenarios include the best hypothetical strategies from the U.S./NATO position—the induction of Sweden and Finland into NATO, Danish diplomatic engagement of Russia, and a U.S. buildup of Arctic operating capacity. Next, we will explore the largest threat strategies that Senturion has indicated are available to Russia: diplomatic engagement and strengthening relationships with Canada, and a worst-case scenario in which Russia is able to co-opt several stakeholder nations into an exclusive Arctic agreement. The exploration of these scenarios should confirm or refute their likelihood and feasibility and allow us to draw conclusions on the best course for U.S. Arctic policy and strategy and the greatest threats within the region moving forward.

### **A. SCENARIO 1: THE ARCTIC “BASE CASE”**

The base case model of Arctic geopolitics shows the most likely outcome if current posture, relationships and power dynamics remain unchanged. The first task when modeling with Senturion is to establish an issue continuum on which all possible outcomes are included. For this thesis, the issue to be modeled is “control of the Arctic”; we intend this term in its broadest possible definition, including legal, political and economic control of the region, but weighted most heavily toward physical and military control. On one end of the spectrum is an equitable balance of power among Arctic stakeholders in which all of the Arctic states reap optimal benefit from the region and there is no substantial military threat or likelihood of conflict (See Figure 7). This might include an international agreement on demilitarization similar to the one established for the Antarctic region. Based on the stakeholders’ Arctic policy objectives, this position is most desirable to all parties other than Russia.

The opposite end of the issue continuum is an Arctic region that is fully controlled and dominated by Russia. This is a possibility, considering the trajectory of current Russian military buildup in the Arctic when compared to the other Arctic states, Russian Arctic policy objectives and the Russian claim to the Lomonosov Ridge, which is currently under review by the United Nations Commission on the Limits of the Continental Shelf. Russian dominance of the region across all domains would be problematic for the rest of the international community in a multitude of ways, ranging from energy security and economic considerations to the threat of nuclear war. Figure 7 depicts the issue continuum as it appears in the Senturion software.

Figure 7. Senturion Issue Continuum Established for Modeling  
“Control of the Arctic”



The next step in the modeling process is to input the importance and influence scores that were established in Chapter III. Figure 8 depicts the initial positions and importance of the Arctic states. Figure 9 depicts the initial positions and influence of the Arctic states, and Figure 10 depicts the initial positions and importance multiplied by influence for each Arctic state.

Figure 8. Senturion Initial Importance Graph and Table,  
“Control of the Arctic”

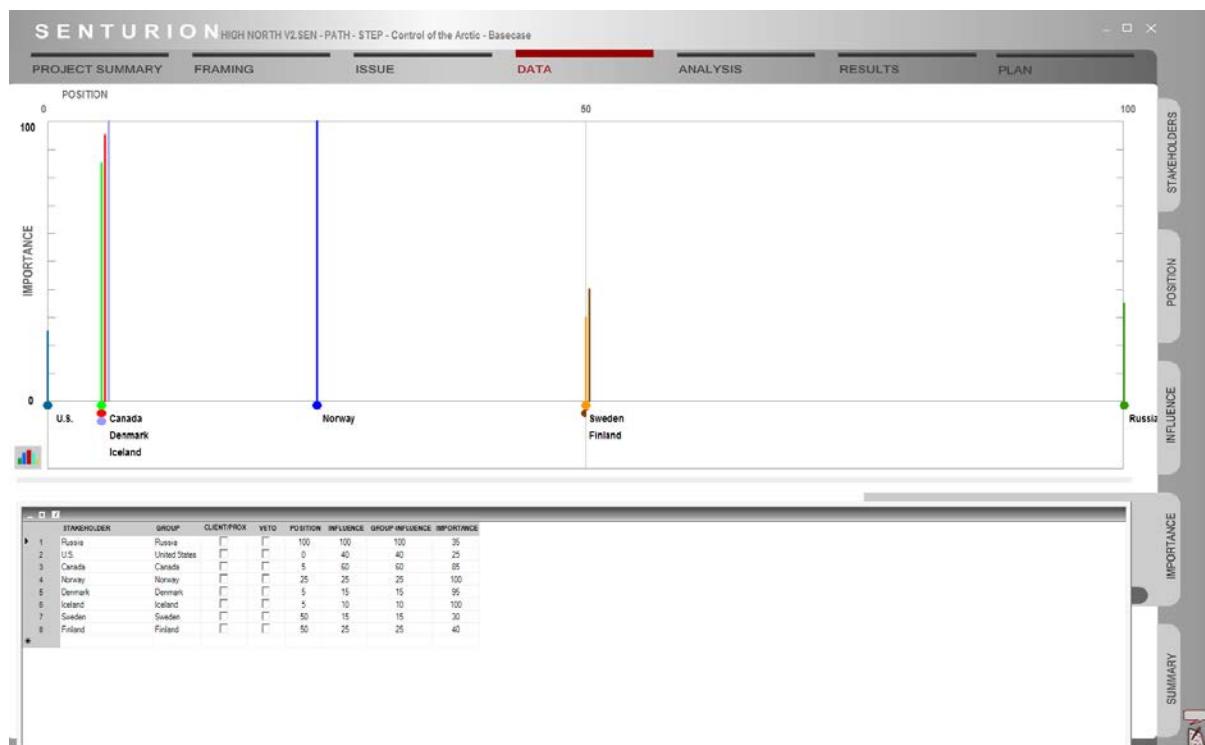


Figure 9. Senturion Initial Influence Graph and Table, “Control of the Arctic”

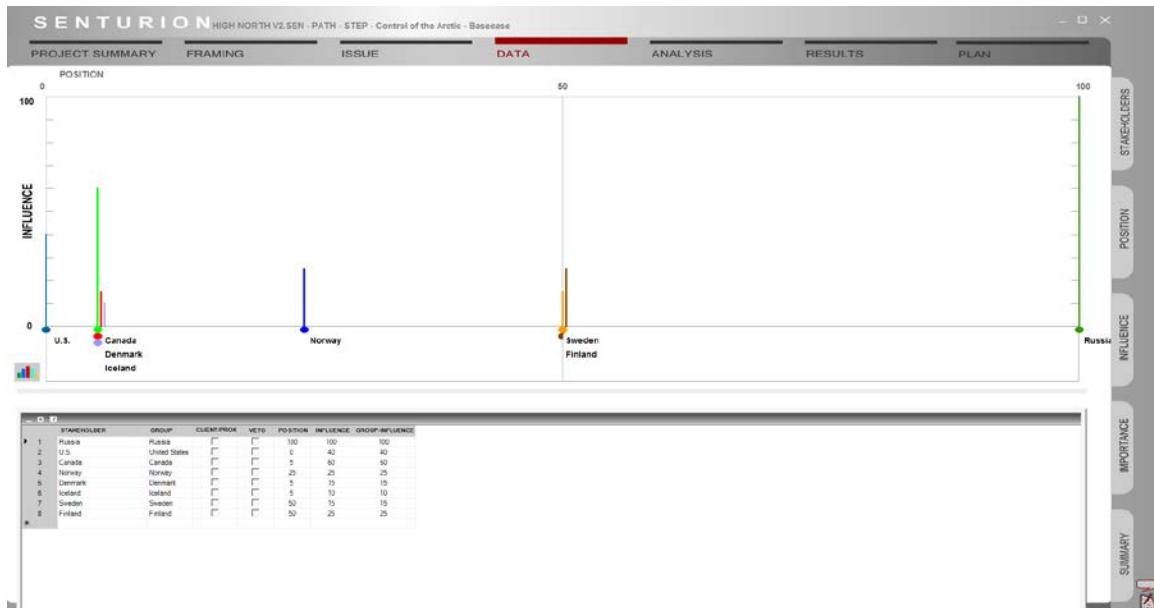
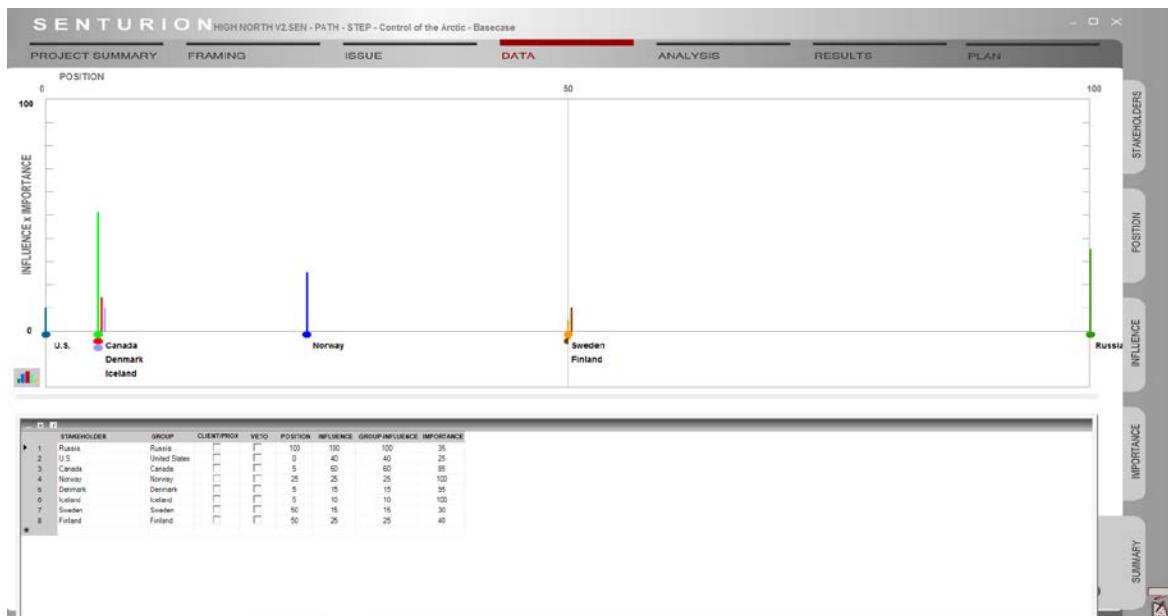
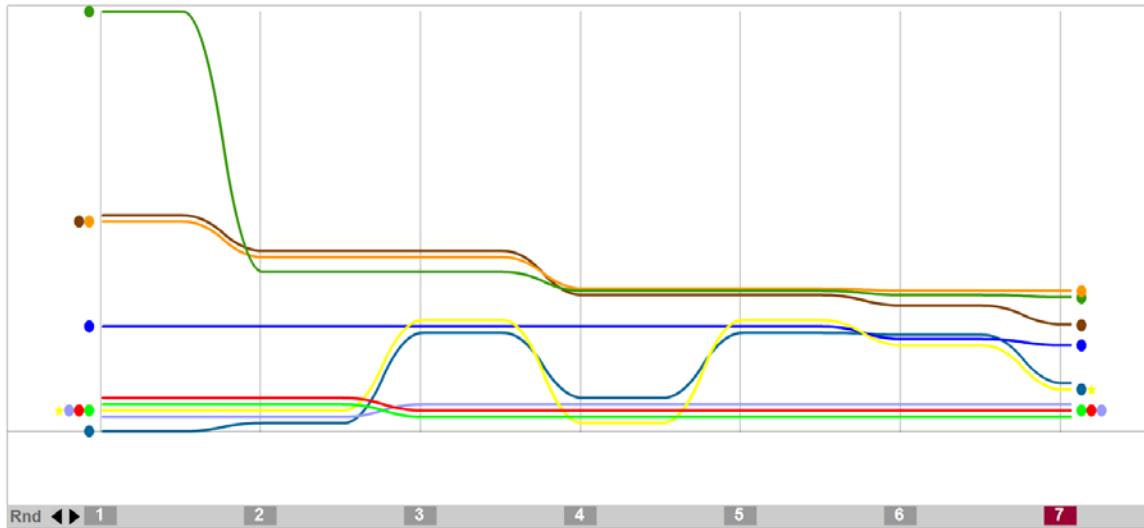


Figure 10. Senturion Initial Importance Multiplied by Influence Graph and Table, “Control of the Arctic”



With all data entered, we ran the base case scenario to model the likely outcome of the current trajectory of Arctic control. The round-by-round flow of stakeholders and positions is depicted in Figure 11.

Figure 11. Senturion Modeling of the Base Case, “Control of the Arctic,” Rounds 1–7

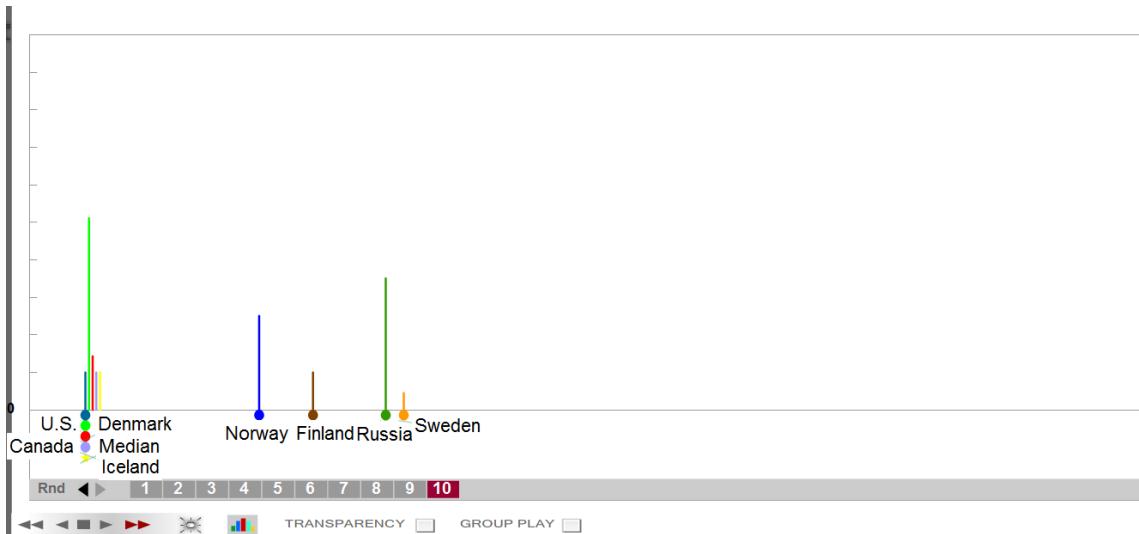


The final results of the simulation are shown in Figure 12.<sup>96</sup>

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<sup>96</sup> In the terminology of the software’s calculations, a *round* is an exchange of information (knowledge about other stakeholders’ positions) between all stakeholders. Given stakeholders’ initial positions, Senturion predicts how they will shift their positions in response to all other stakeholder proposals. In other words, a round assumes that each stakeholder has heard the “offers” of every other stakeholder and has had time to process the relative benefits of each (see Senturion Manual, 85). Subsequently, stakeholders accept credible offers that minimize change from their initial positions. The Senturion algorithm then takes these new stakeholder positions and iterates the process to simulate negotiation dynamics. In the real world, a round is a contextually defined measure of time. The larger the situation, such as the international negotiations to be modeled for the Arctic, the longer a round takes (Senturion Manual, 85). Given the lack of official head-of-state meetings on the Arctic, our best measure of what realistically constitutes a round is the two-year cycle in which chairmanship of the Arctic Council rotates. During each two-year period, the Arctic council typically meets four times, but it has yet to progress or create policy at the same pace.

Figure 12. Senturion Modeling of the Base Case, “Control of the Arctic,” Final Positioning



After 10 rounds of simulation, the model indicates that each Arctic stakeholder will come to rest along the continuum in a position where it can no longer be compelled further, and the issue will be as close to a consensus as it can be.

Figure 13 provides a numeric version of the line graph; the position shifts for each stakeholder round by round, and the shading of the text and the cells has meaning and is very important when attempting to identify strategies.<sup>97</sup> When a box is shaded orange, it indicates that the stakeholder has unrealized leverage during a round that could be used to move another stakeholder toward the desired position. When a box has bold red numerals, it indicates that the stakeholder is in conflict, with other stakeholders on both sides of the current position attempting to lever the targeted stakeholder toward their own positions.<sup>98</sup>

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<sup>97</sup> Senturion Forecasting LLC, Senturion Analyst Guide Government Version 5.2, 104.

<sup>98</sup> Ibid., 125.

Figure 13. Senturion Round-by-Round Table of Positions, “Control of the Arctic,” Base Case

Stakeholder	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
Median	5	5	25	5	24.7	22.4	5	5	5	
Russia	100	38.2	38.2	33.5	33.5	33.4	32.1	32.1	32.1	32.1
U.S.	0	5	25	5	24.7	23.2	14	5	5	5
Canada	5	5	5	5	5	5	5	5	5	5
Norway	25	25	25	25	25	22.4	5	5	5	5
Denmark	5	5	5	5	5	5	5	5	5	5
Iceland	5	5	5	5	5	5	5	5	5	5
Sweden	50	41.7	41.7	34	34	33.9	33.9	33.9	33.9	33.9
Finland	50	42.8	42.8	32.7	32.7	30.9	26.1	26.1	26.1	26.1

A stakeholder-by-stakeholder analysis of the Arctic base case will provide indications of likely “current course” outcomes and potential unrealized leverage, strategies, and threats for each.

## 1. United States

The United States’ initial position is at the absolute bottom of the continuum. As depicted in Figure 10, the U.S. does not have major leverage in the Arctic, due to relatively low scores in both importance and influence. As the model progresses, the U.S. is swayed several times to the Norwegian position on the continuum at 25 before settling back to a five at the conclusion of 10 rounds.

Interestingly, the U.S. movement toward the median is a result of leverage executed by Sweden, Finland and Norway. Norway is a NATO ally, and Sweden and Finland are typically considered closer to NATO than to the Russian sphere of influence, but the modeling is consistent with observations that Arctic cooperation with Russia is

often symbiotic for these three states. The 2010 Barents Sea Treaty between Norway and Russia establishes a delimitation between the nations' economic exclusion zones and provides a framework for resource sharing to include the continuation of the Norwegian-Russian Joint Fisheries Commission.<sup>99</sup> Finland has been and is engaged in joint shipbuilding ventures with Russia, to include the production of high-tech Arctic vessels, and the two nations have discussed a larger Finnish-Russian Arctic Partnership that would include joint development of the Barents Sea Shelf and marketing of the Northern Sea Route.<sup>100</sup> Similarly, Sweden has been weighing the benefits of its Arctic cooperation with Russia against the prospect of joining NATO and remains undecided between the two positions.

The model indicates that these three states will attempt to persuade the United States toward a more moderate position and to accept a larger degree of Russian control within the Arctic Region. At the end of the simulation, the United States position is moved back to a five by Canadian influence. As indicated by the lack of orange boxes in Figure 14, at no point during the simulation does the United States have unrealized leverage on another Arctic state.

Analysis of the Senturion output illuminates several potential strategies for optimizing the U.S. end state in the Arctic: aggressively engaging the pivotal states of Norway, Sweden and Finland toward a larger diplomatic agreement in the Arctic; leveraging all influence to pull Finland and Sweden into NATO as soon as possible; and expanding military and infrastructure capability in the Arctic to increase American influence in the region. These potential strategies will be modeled and tested later in this chapter.

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<sup>99</sup> Tore Henriksen and Geir Ulfstein, "Maritime Delimitation in the Arctic: The Barents Sea Treaty," *Ocean Development & International Law* 42, no. 1–2 (2011): 9.

<sup>100</sup> Thomas Nilsen, "Finland Expands Arctic Cooperation with Russia," *Barents Observer*, February 10, 2011, <http://barentsobserver.com/en/sections/arctic/finland-expands-arctic-cooperation-russia>.

## **2. Russia**

In the Arctic base case, the model indicates that Russia will initially be compelled toward the middle of the continuum, characterized by a reasonable balance of power and international cooperation. Ultimately, though, Russia will settle at a 38, a position that translates to hesitant cooperation with the other Arctic stakeholders while still maintaining an advantage in the physical and military domains and likely resisting the Arctic proposals or interests of the other stakeholders. The model indicates that Russian military dominance in the Arctic will be somewhat muted or surpassed by diplomatic persuasion when it comes to affecting outcomes. The model shows Russia with several rounds of unrealized leverage to move other states toward its position.

The largest unrealized and potentially threatening Russian leverage is toward Canada. This may seem surprising, but a December 2015 analytic seminar wargame conducted by this research team indicated that this leverage may exist. Canada and Russia share a common interest in establishing full legal sovereignty of their territorial waters and economic exclusion zones. Such internationally recognized sovereignty would give Canada de facto control of the Northwest Passage and Russia full control of the Northern Sea Route, the two commercial shipping routes emerging as the High North melts (see Figure 4). The economic benefits of this would be significant, and the Canadian government would be very likely to consider Russian diplomatic offers to bilaterally recognize this and support one another. A simulation in which Russia maximizes its leverage against Canada will be conducted later in this chapter to test the possible outcome of that scenario.

## **3. Canada**

Due to the importance that Canada places on the Arctic region, it is the strongest stakeholder on the lower end of the issue continuum and is not moved off of its position at any point in the 10-round base case simulation. Canada uses its influence to bring Russia, Sweden, Finland and even Norway toward its preferred position. There is some unrealized leverage for Canada in the later rounds of the simulation, but this has insignificant impact on the final output. In the base case, Canada executes its optimal

strategy and plays the most significant role among the NATO countries in anchoring the position and pressuring Russia toward international cooperation. The takeaway from the analysis of how Canada behaves in the model is that the U.S. should continue to bolster or increase support to Canada on all Arctic matters.

#### **4. Norway**

The Norwegian position remains largely unchanged at 25 on the continuum throughout the base case model. This is consistent with the real-world Norwegian Arctic policy and position. Norway will likely continue to straddle the line between the benefits of deeper international cooperation in the Arctic, NATO allegiance, and a bilateral Arctic relationship with Russia in which Norway makes moderate concessions to Russia in order to reap the maximum benefit for itself.

#### **5. Denmark**

The Danish position begins at a five on the continuum and never wavers, despite multiple failed attempts by Russia, Sweden and Finland to move it toward a more moderate position. The model indicates that Denmark has significant unrealized leverage to move Russia toward the lower end of the continuum in the first two rounds; we will explore the real-world existence of this leverage and a test of this strategy for Denmark later in this chapter.

#### **6. Iceland**

Like Denmark's, the Icelandic position remains steady throughout the base case simulation at a five on the continuum. Despite the importance of the Arctic region to Iceland, the Icelandic position is one of the weakest due to its lack of military capability. The model indicates that Iceland may possess minor unrealized leverage toward Russia, Finland and Sweden in round two, but the effect of exercising this leverage is negligible on the final outcome of the scenario, and we will not explore it any further.

## **7. Finland**

The simulation indicates that aside from Russia, Finland has the greatest potential to be moved toward the lower end of the continuum. Finland begins at a position of 50 and is moved by multiple stakeholders to a final position of 26, despite efforts by Russia to keep it from moving toward the NATO states. Finland does have unrealized leverage to move the United States, Iceland and Denmark toward the Russian position, and this will be explored later in the chapter in a “worst-case scenario,” where Russia is able to pull Finland and Sweden away from NATO and into an alliance.

## **8. Sweden**

Sweden moves from an initial position of 50 down to a final position of 34. Due to relative weakness, Sweden has minimal leverage against other stakeholders, and execution of its unrealized leverage does not affect the scenario outcome. This being said, Sweden, like Finland, is still a pivotal player in the Arctic dynamics and will be part of the alternate modeling of Sweden and Finland as part of NATO and conversely as part of an Arctic alliance with Russia.

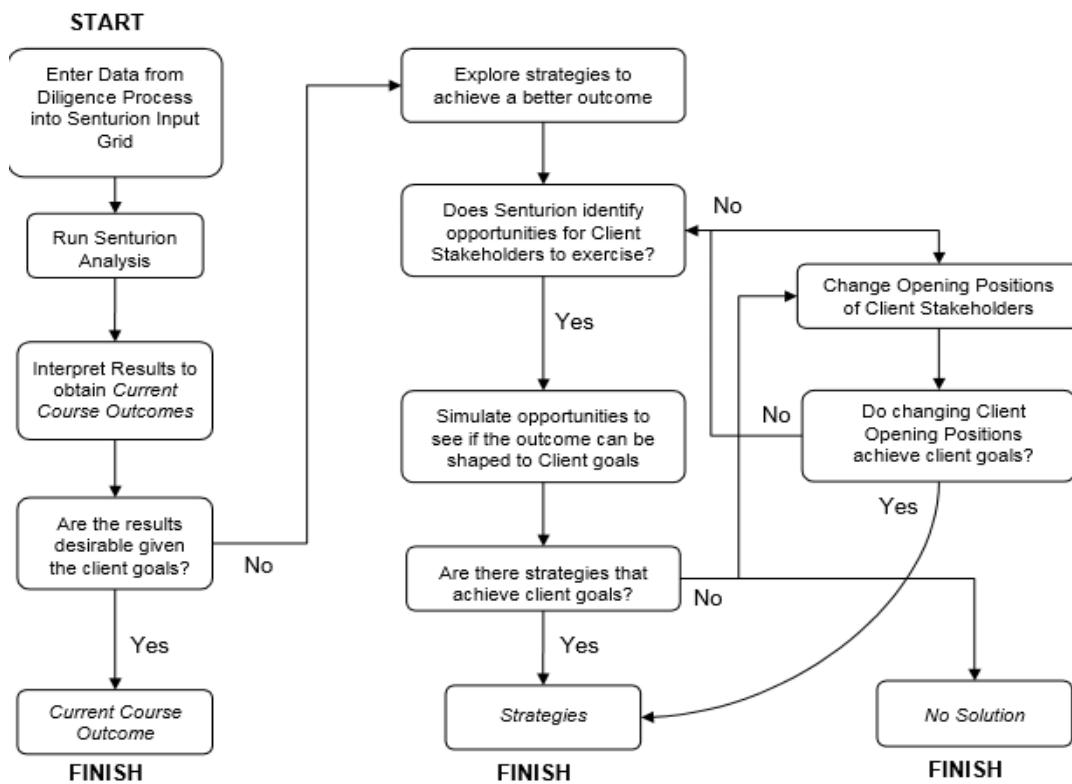
The base case Senturion modeling of Arctic control has demonstrated some interesting trends, hypotheses and areas for further exploration. As with any abstract modeling application, the indicated strategies should be “sanity checked” against reality and then modeled and analyzed for feasibility.

The overall outcome of the base case indicates that if the current course trajectory remains, the next 20 years will show Russia moving sharply toward international cooperation in the Arctic, though ultimately Russia, Sweden, Finland and to a lesser degree Norway will remain resistant to a true balancing of Arctic powers or strong cooperation in diplomatic and economic matters in the region. The model also indicates that the United States has significantly less leverage over the other Arctic states than it typically does in international affairs and that Canada is the true NATO powerhouse and anchor when it comes to Arctic influence. The base case model has provided insight into several possible strategies that could significantly alter the outcome of the issue in favor of various stakeholders.

## B. MODELING ALTERNATIVE SCENARIOS IN SENTURION

With the base case scenario established, the five previously mentioned alternate scenarios will be modeled by adjusting the inputs to the base case scenario in the Senturion program. The flow chart in Figure 14 describes the methods available for accomplishing this.

Figure 14. Senturion Flow Chart for Identifying Strategies to Optimize Client Outcomes<sup>101</sup>



The diligence process referred to in this flowchart refers to the data development process we described in “Determining Initial Data Set” in Chapter III.

The two methods of manually changing the simulation to test strategies and outcomes are to exercise unrealized leverage and to change starting positions. Exercising unrealized leverage simulates one stakeholder targeting another stakeholder during a particular round to attempt to move them toward the first stakeholder’s position; a change

<sup>101</sup> Senturion Forecasting LLC, Senturion Analyst Guide Government Version 5.2, 14.

in starting position simulates a stakeholder taking action to negotiate the movement of another stakeholder toward the preferred position. Starting positions are changed by altering the importance, influence or initial position in the data tables prior to running the simulation, whereas unrealized leverage is exercised during each round of the simulation. In the alternate scenarios simulated below, both methods are used during testing.

## C. TESTING POSSIBLE UNITED STATES STRATEGIES

In this section, three possible United States strategies identified by the initial Senturion base case will be investigated in detail.

### 1. Scenario 2: Finland and Sweden Join the NATO Alliance

The first strategy tested was a scenario in which the United States and NATO convince Sweden and Finland to apply for NATO membership and NATO votes to induct these states. For the purpose of the simulation, it is assumed that this move could be conducted in less than two years, or one round of the Senturion simulation. To adjust the model to accurately portray how this would affect control of the Arctic, the positions of Sweden and Finland were adjusted in the first round from a 50 to a 25, not bringing them all the way into low-end positions but leaving them on par with Norway, another NATO member with closer Arctic ties to Russia.

Interestingly, once moved half the distance closer to the majority NATO sphere of influence, Sweden and Finland, along with Norway, are all immediately persuaded down to the position of the other NATO Arctic states at around five on the continuum (see Figure 15). Then, between rounds two and three, the consolidated position of international cooperation among the seven Arctic states who are also NATO members exercises enough leverage to move Russia all the way down to the position of consensus at the lower end of the continuum. Of all the alternate scenarios tested in Senturion, this one came the closest to reaching consensus on the issue of Arctic control (see Figure 16). These results and their likelihood and applicability to real-world Arctic geopolitics will be explored in Chapter V.

Figure 15. Senturion Modeling of Finland and Sweden Joining NATO,  
Rounds 1–7

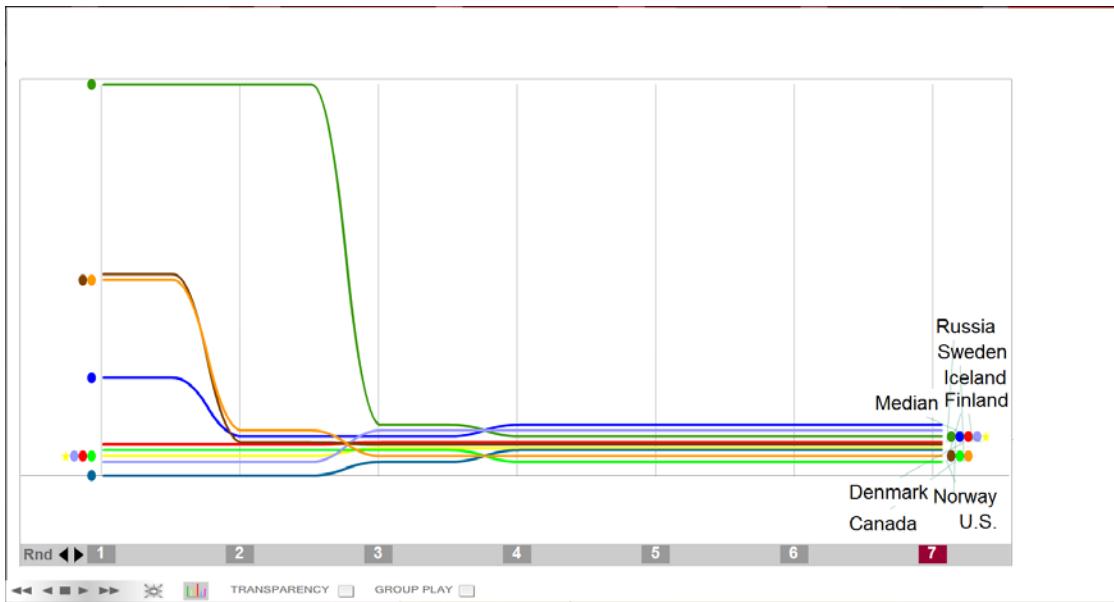
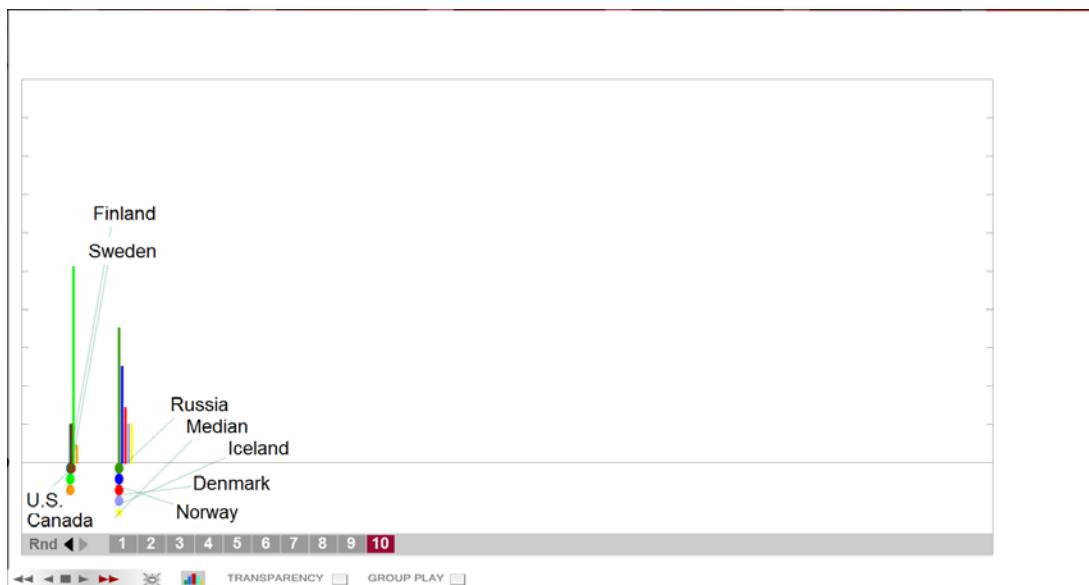


Figure 16. Senturion Modeling of Finland and Sweden Joining NATO,  
Final Positioning



## **2. Scenario 3: Danish Diplomatic Engagement Drives Russia toward the Preferred Position**

The base case model indicated that Denmark possesses significant unrealized leverage to move Russia toward the U.S./NATO preferred position in the first and second rounds. The research team explored this to determine whether any real-world leverage in fact exists for Denmark with Russia. Denmark is an Arctic nation only by way of Greenland, a massive resource potential. Denmark and Russia have made geographically overlapping claims to the United Nations Commission on the Limits of the Continental Shelf for a 550,000-square-kilometer area of the Arctic that includes the North Pole.<sup>102</sup> Because the United Nations Commission on the Limits of the Continental Shelf is expected to take until 2019 to rule on the various claims of the Arctic nations, Russia has made several overtures to Denmark attempting to establish a bilateral agreement with a line of delimitation between them.<sup>103</sup> Russia is seeking an agreement similar to its 2010 Barents Sea Treaty with Norway that will expedite the recognition of what it claims as sovereign territory by extending the underwater continental shelf. This scenario certainly implies that Denmark has real leverage to compromise with Russia and move Russia toward the position of international cooperation in the Arctic by agreeing to a mutually accepted delimitation line. While the Barents Sea Treaty likely moved Norway closer to the Russian sphere of influence, a delimitation treaty between Denmark and Russia may have the opposite effect and pull Russia toward cooperation with the other Arctic nations.

The Senturion model was manually altered to simulate Denmark exercising this leverage against Russia in the first round of the simulation. In the base case, Russia is moved from 100 to a position of 38 in the first round. With Denmark now executing the unrealized leverage, Russia is compelled to a position of 18 at the conclusion of the first round, significantly closer to the U.S./NATO preferred position (see Figure 17). As a result of the change in the Russian position, Sweden, Finland, and Norway move lower as well, and the simulation concludes with all eight Arctic nations within 12 points of a

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<sup>102</sup> “Russia Eyes Arctic Deal with Denmark,” *The Local*, September 8, 2016, <https://www.thelocal.dk/20160908/russia-eyes-arctic-deal-with-denmark>.

<sup>103</sup> Ibid.

consensus, ranging from five to 17 on the issue continuum (see Figure 18). This indicates that a possible United States strategy may be to encourage Denmark to diplomatically engage with Russia and establish a bilateral agreement on delimitation well before the United Nations Commission on the Limits of the Continental Shelf publishes its findings. This strategy incurs risk by encouraging recognition of Russian territorial claims, but the potential to compel Russia into international cooperation in the Arctic as a result may be worth it.

Figure 17. Senturion Modeling of Denmark Exercising Unrealized Leverage against Russia, Rounds 1–7

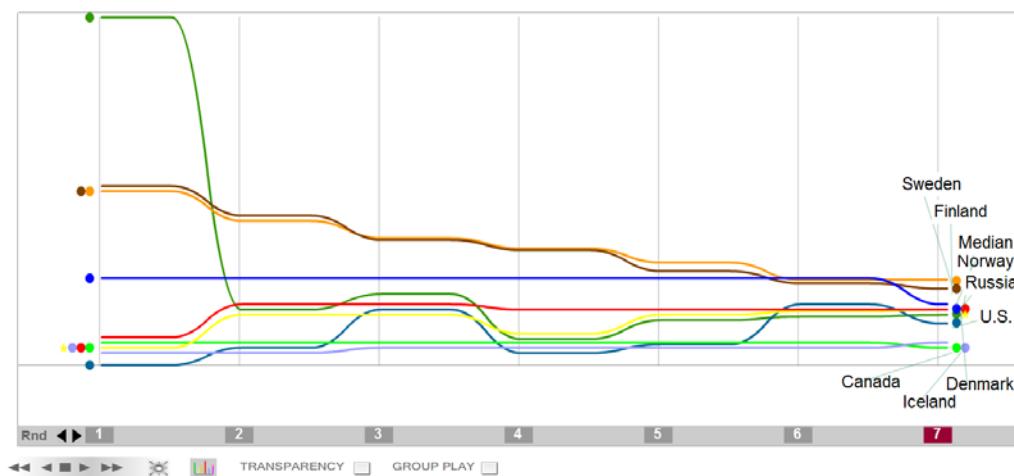


Figure 18. Senturion Modeling of Denmark Exercising Unrealized Leverage against Russia, Final Positioning

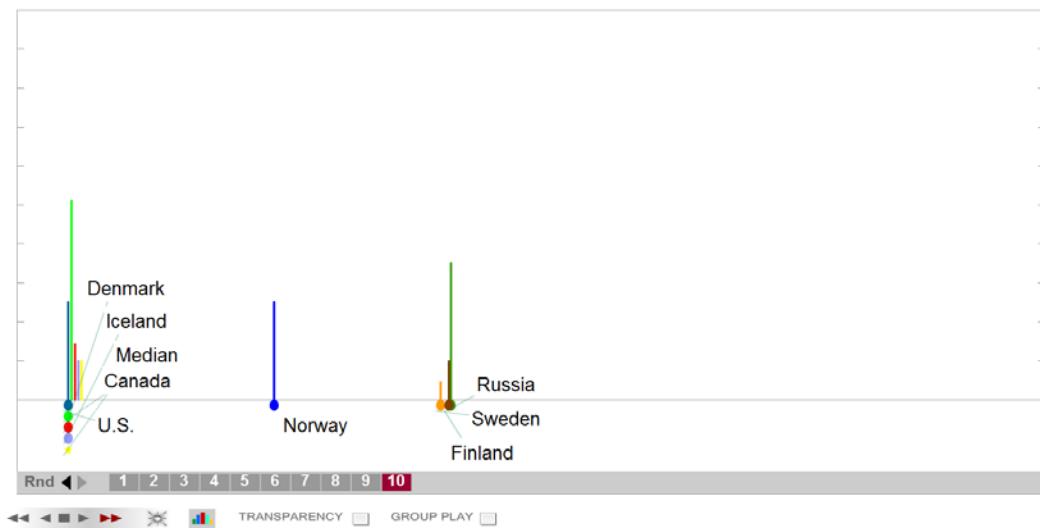


### 3. Scenario 4: United States Builds up Arctic Operating Capacity to Match Russia

The fact that the United States has no notable leverage on other Arctic nations in the base case simulation stood out as a concern during the analysis. Though the reality of larger global affairs clearly indicates that the United States does in fact have leverage over the other stakeholders through other avenues and geographic areas, the research team was interested in the lack of leverage indicated by Senturion, so we ran an alternate scenario in which the United States builds Arctic operating capacity in the military, industrial and commercial domains to reach parity with Russia, to see how this would change the outcome of the simulation without changing any other factors.

To simulate this move, we increased the United States' initial influence score to be equal to Russia's and did not alter the importance score or any other data in the model. The results are displayed in Figure 19.

Figure 19. Senturion Modeling of a U.S. Arctic Operating Capacity Increase to Match Russia, Final Positioning



The results of this alternate scenario indicate that a large U.S. investment in operating capacity to meet the Russian buildup would actually be counterproductive to reaching a consensus position toward international cooperation. The final positions of Russia, Sweden, Finland and Norway are farther away from the other Arctic nations than they are in the base case. This indicates that a U.S. Arctic buildup may in fact cause a polarization of Arctic nations into two camps, with no real agreement on international cooperation. The underlying cause of this can be seen in the model by observing the perceptions of each stakeholder from round to round. With increased influence on the lower end of the continuum, the United States is actually perceived by Russia, Sweden and Finland as a hostile threat, putting these three stakeholders in a “conflict” status with the United States throughout the majority of the 10-round simulation. This simulation supports many existing opinions and hypotheses that a rush to build operating capacity in the Arctic, particularly in the military domain, is counterproductive to reaching an optimal outcome for all Arctic nations.

## **D. TESTING POSSIBLE RUSSIAN STRATEGIES TO DOMINATE THE ARCTIC REGION**

In this section, two possible Russian strategies identified by the initial Senturion base case will be investigated in detail.

### **1. Scenario 5: Russian Diplomatic Engagement and Strengthening Bilateral Relationship with Canada**

The base case simulation indicated that Russia had significant unrealized leverage to move Canada off its position at the lower end of the issue continuum. When observing real-world Arctic geopolitics, Russian leverage against Canada is certainly not intuitive; however, the Senturion indicator coupled with a similar result during a High North seminar wargame conducted by the research team in December 2015 suggest the possibility of such leverage should be explored further.

Though staunch allies, a potential rift exists between the U.S. and Canada in the Arctic region. As Scott Borgerson and Michael Byers wrote in an article for the *Wall Street Journal*, “Canada claims the channels between its Arctic islands that connect the Atlantic Ocean to the Beaufort Sea north of Alaska are the country’s ‘internal waters.’ The U.S. maintains that the waterway is an ‘international strait’ through which ships and aircraft from all countries have a right of uninterrupted ‘transit passage.’”<sup>104</sup> The implications of this disagreement are large when considering the potential economic benefit to Canada of having full control of one of only two Arctic transit routes. If the United States and Canada fail to resolve this Northwest Passage dispute in a timely manner, Russia may use it to attempt to drive a wedge between the two allies.

Similar to Canada, Russia is seeking international recognition of its territorial claim to the vast majority of the Northern Sea Route. Legal sovereignty over the Northern Sea Route would allow Russia to tightly control the route and reap economic benefits from its use while further dominating the Arctic. Due to the fact that both Russia and Canada are seeking territorial claims on the same basis, the potential for bilateral

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<sup>104</sup> Scott Borgerson and Michael Byers, “The Arctic Front in the Battle to Contain Russia,” *Wall Street Journal*, March 8, 2016, <http://www.wsj.com/articles/the-arctic-front-in-the-battle-to-contain-russia-1457478393>.

agreement and recognition of one another's claims is feasible and mutually beneficial. It could lead to further bilateral Arctic cooperation between the two nations, to the exclusion of other Arctic nations.

To model this scenario in Senturion, Russia's unrealized leverage targeting Canada was executed in the first round. While Russia still moved from 100 to 38, Canada was compelled upward to a position of 36 (see Figure 20). Russia, Canada, Sweden and Finland held around this number through the rest of the simulation, and the final positioning placed Russia, Canada and Sweden around a 40, Norway and Finland approximately halfway at 25, and the U.S., Iceland and Denmark at five (see Figure 21). This result can be translated to a lack of consensus, lack of broad stakeholder cooperation, and an unlikely Arctic partnership between Russia and Canada that would be a significant threat to United States interests. The best method for the United States to counter this potential Russian strategy would be to aggressively seek settlement concerning the U.S. and Canadian dispute over the Northwest Passage.

Figure 20. Senturion Modeling of Russia Exercising Unrealized Leverage with Canada, Rounds 1–7

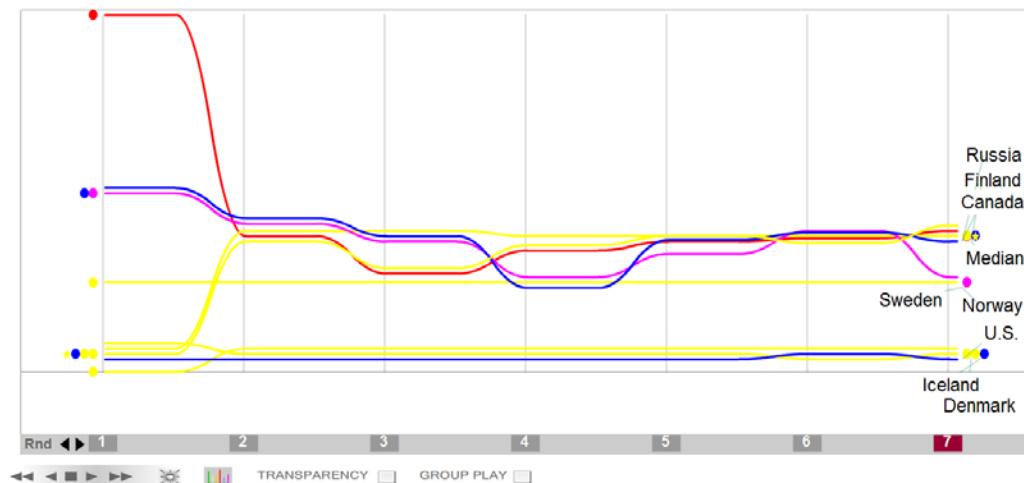
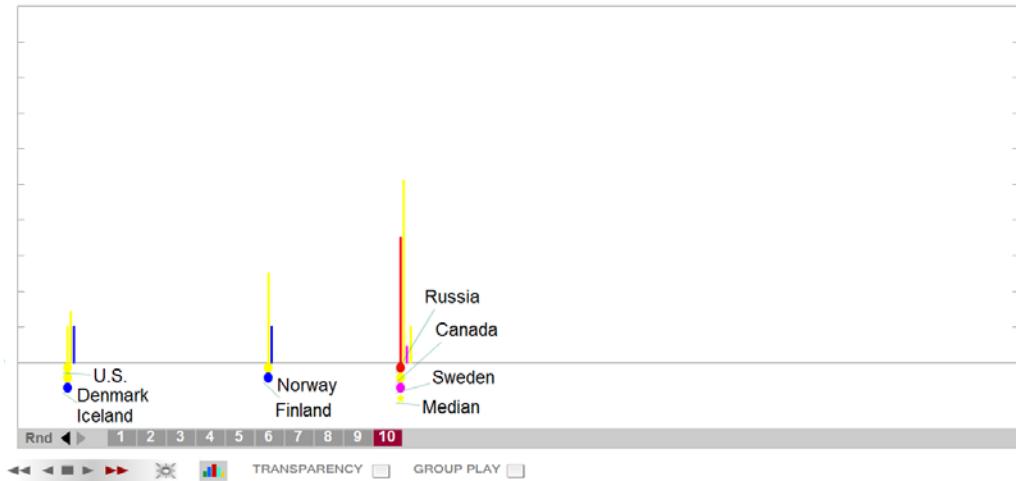


Figure 21. Senturion Modeling of Russia Exercising Unrealized Leverage with Canada, Final Positioning



## 2. Scenario 6 (Worst-Case Scenario): Russia Leverages Canada, Sweden, Norway and Finland into an Exclusive Arctic Partnership

The base case model indicated that in addition to its early-round unrealized leverage toward Canada, Russia has leverage against Norway, Sweden and Finland. For the worst-case scenario, we assumed that Russia could maximize its leverage against all four states to pull them toward a position that supports Russian interests and deliberately excludes the United States. We manually manipulated the model for Russia to execute all unrealized leverage round by round (see Figure 22).

The real-world precedence for this scenario is not as well-grounded as the previous alternative scenarios; however, it is still a reasonably possible outcome. The final positioning of this simulation shows a Russian-dominated Arctic region, with Canada and the Nordic states complicit with Russian dominance (see Figure 23). On the lower end of the continuum, the United States, Denmark and Iceland hold a position of five, but international cooperation in the Arctic including all eight stakeholders is highly unlikely. The key takeaway from this alternative scenario is that the United States must remain diplomatically engaged with all of the Arctic nations. It also reinforces the idea of Sweden and Finland as pivotal states for the future of geopolitics in the emerging High North.

Figure 22. Senturion Modeling of a “Worst-Case Scenario”: Russia Utilizes All Leverage to Build Position, Rounds 1–7

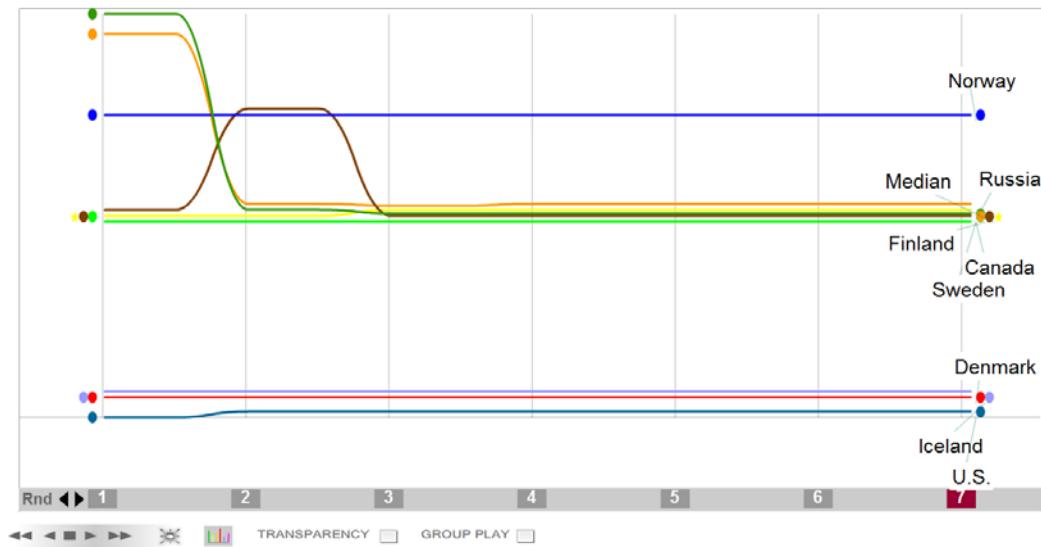
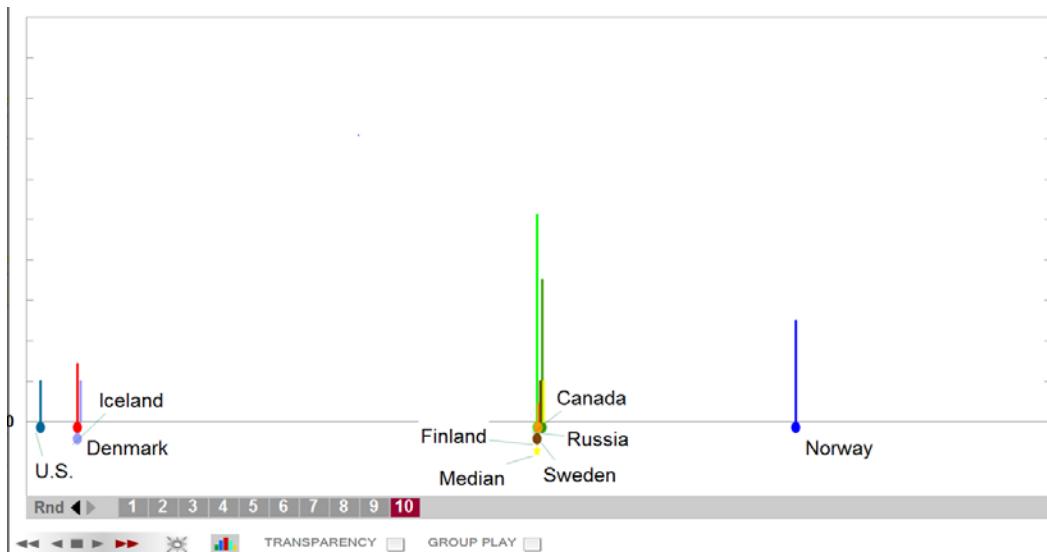


Figure 23. Senturion Modeling of a “Worst-Case Scenario”: Russia Utilizes All Leverage to Build Position, Final Positioning



## **V. FINDINGS AND CONCLUSION**

### **A. OVERALL STRATEGIC UTILITY OF THE HIGH NORTH**

As the High North emerges as a vital strategic area of interest and climate change continues its current trajectory, there will be greater access to the High North, which will elevate its global importance. The High North will be increasingly important to 21<sup>st</sup>-century geopolitics. As sea ice continues to rapidly retreat, the Arctic will emerge as the nexus of scientific exploration and resource expansion. Competition for natural resources previously covered by ice are now becoming more accessible and in higher demand. This melting of ice will create new trade routes between the Pacific and Atlantic Oceans that will become passable in the next generation. This accessibility for all will keep the High North in center crosshairs as countries compete for access to the wide range of minerals in the region.

### **B. SUMMARY OF SENTURION ANALYSIS AND COURSES OF ACTION**

Throughout this project, six scenarios were run multiple times each, using Senturion to forecast the most likely geopolitical development of the Arctic in the coming decades. In addition, an effort was made to identify the best possible outcome for United States policy objectives and national interest, as well as the worst-case scenario for the United States.

In order to conduct the simulations with as much accuracy and rigor as possible, the research team collected data from a wealth of sources and established a framework to best translate qualitative information into the quantitative input data required by Senturion. The intent of this research is to gain insight by using a relatively new wargaming application to assist the United States in understanding strategies and identifying threats that are not intuitive and have not been previously identified in detail.

#### **1. Most Likely Course of Action**

The most likely outcome for the High North over the next two decades of development will be characterized by strained and hesitant international cooperation

among the Arctic states. The polarity of NATO versus Russia in the larger international landscape will likely be the primary constraint to full international cooperation and the potential for demilitarization of the Arctic. The simulations conducted with Senturion as part of this thesis indicate that Russia can be moved closer to a position of international cooperation in the Arctic region, albeit on its own terms and only when it serves Russian national interest. Russia owns the largest percentage of Arctic territory and far outpaces all other Arctic states in operating capacity within the region in all domains, including military. Without a monumental shift in the balance of power, Russia will likely continue to exploit its weighted advantage in the Arctic without overtly causing significant conflict in the region. The simulation shows that many of the Arctic states, NATO members or not, often prefer bilateral diplomacy with respect to the Arctic.

Recent history has shown and Senturion indicators of likely future agreements confirm that when it comes to the Arctic, all states are willing to negotiate with traditional adversaries if it best serves their interest. Examples of this would be Norway, Sweden, Finland, Canada and Denmark and their indicated willingness to sign bilateral Arctic treaties and cooperation agreements with Russia, despite being diametrically opposed to Russia in other parts of the world.

Without further investment in and higher prioritization of the United States Arctic interests, the most likely outcome for the United States will be an atmosphere of subordination to Russia in the region and a general lack of influence over the other Arctic states when it pertains to Arctic issues. The analysis of the Senturion output reveals that Russian strategic military domination of the Arctic if the U.S. does not invest in a buildup of Arctic capability is highly unlikely. The more likely scenario is one in which U.S. interests are marginalized and the U.S. policymakers' ability to influence the greater international community of Arctic states on issues such as economic development and environmental protection is hamstrung.

Overall, the modeling we have conducted with Senturion indicates a mediocre status quo outcome for the United States without any major changes to current Arctic policy. It is unlikely that a lack of further investment in the Arctic will present any grave

danger to long-term U.S. national security, but as alternate-course Senturion simulations indicate, some adroit diplomacy may better position the United States in the region.

## **2. Optimal United States Course of Action**

The Senturion simulations have indicated several strategies for the United States that can optimize the outcome for the U.S. in the Arctic without significant further investment of anything other than diplomacy. The first is for the United States to take the lead in encouraging Sweden and Finland to apply for NATO membership and to lobby support among current NATO members to vote to induct these two nations into the alliance. The movement of these two states further into the NATO and U.S. sphere of influence would sway Arctic influence in favor of the U.S. position.

The second indicated strategy for the United States is to encourage its allies, namely Denmark, to diplomatically engage Russia and utilize unrealized leverage to bring Russia further into the fold of international cooperation in the Arctic, but on U.S. and NATO terms. In general, the United States should most likely take the lead in pursuing larger international cooperation among the Arctic states and attempt to formalize it in signed agreements.

Our analysis indicates that if the United States uses some or all of these strategies, there is a strong potential to reach a U.S.-optimal Arctic outcome in the next 20 years without excessive financial or resource investment. This outcome would be characterized by large-scale formalized international cooperation amongst the Arctic states, perhaps turning the Arctic Council into an actual legal body, and maximizing the potential of the Arctic for all of its stakeholders while preventing aggressive exploitation by non-stakeholders such as China and India.

## **3. Worst-Case United States Course of Action**

At the opposite end of the continuum of potential Arctic outcomes is a Russian-dominated Arctic. In the Senturion modeling of this scenario, our analysis shows that Russia can diplomatically leverage first Canada and then Sweden, Finland and Norway away from the United States' position and toward its own. These nations would be

willing to make larger concessions to Russia and would enter significant diplomatic agreements that further strengthened the Russian position in the Arctic. With control of these other stakeholders, Russia would have relatively free reign of the Arctic, and U.S. influence and deterrence would be minimized.

The best U.S. counterstrategy to likely Russian strategies that would produce this outcome is to build up bilateral and multilateral Arctic cooperation agreements with the nations indicated as vulnerable to Russia. This includes settling the ongoing Northwest Passage dispute that the United States has with Canada and ties back to the strategies of engaging the Nordic states and attempting to pull them closer to the U.S. with respect to Arctic matters.

## C. FUTURE POLICY IMPLICATIONS IN THE HIGH NORTH

### 1. Diplomacy before Military Action

When we began research on the topic of the emerging High North, much of the current event literature indicated that Russian buildup, published rhetoric and actions in the region are intended to dominate it in a hostile and militarized way. When we compared United States' and NATO's Arctic military capabilities and posture to those of Russia, our initial hypothesis was that the United States would need to make a significant additional investment in Arctic military capability to counter a significant and emerging threat. What we found is that significant military conflict or the wielding of military might as an instrument of power in the Arctic is not likely.

Despite the changing climate, the Arctic will remain a formidable and severely restrictive environment for military operations, or any operations for that matter. As Patrick Arnold, the director of business at the Maine Port Authority, insightfully stated, "Before you can kill each other in the Arctic, you have to first be able to survive."<sup>105</sup> Other factors such as sustainment limitations and a lack of population centers within the region, as well as simply its size, make it nearly impossible to assert any type of military control. In addition to research, our modeling indicates that military might has a

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<sup>105</sup> Informal conversation with Patrick Arnold, Director of Business, Maine Port Authority, July 19th, 2016, Portland, Maine.

fractional effect on influence and control within the Arctic Region. When we increased the United States' military capability in our model to be on par with Russia's, the outcome was unexpectedly negative for the United States. Rather than allowing the United States to increase influence and pull the other stakeholders toward a position of international cooperation, the change further polarized the Arctic stakeholders, pushing those already closer to the Russian position further toward it and preventing Russia from coming toward the median position preferred by the United States.

The alternate scenarios that were most successful in moving a consensus of stakeholders toward the U.S. position were simulations of diplomatic actions, not kinetic or military ones. The larger theme that emerges is that it will be policy and diplomatic engagement that sway the future of the Arctic most drastically. Between Russia and the United States, the heavyweight who can leverage diplomacy, information and economic incentive to best convince the smaller stakeholders to move toward their desired outcome is the one who will achieve their objectives.

## **2. Preemptive and Aggressive Negotiation Strategies—Pivotal States (Sweden/Finland/Norway)**

Our research and modeling indicate that the Nordic States of Sweden, Finland, and Norway are the most vulnerable to Russian influence and exploitation in the Arctic Region. As such, they also hold the most leverage to influence Russia towards larger international cooperation in the region. For this reason, we want to label these three countries as the “pivotal Arctic states,” this is to say that the future geopolitical landscape of the Arctic will be profoundly shaped by the direction that these three countries take with their Arctic policies and international agreements.

When seeking the best courses to achieve United States policy objectives and positioning in the emerging High North, the U.S. should focus on these three countries.

## **3. Private and Public Partnerships**

In order to maximize influence and ensure all stakeholders in the High North mutually benefit from the region, it is essential to foster both private and public partnerships. Taking advantage of opportunities for trade between ports in the United

States and Iceland and Norway opens the window into positively impacting the region. Maximizing transportation of food, household goods and various other amenities paves the way for exchange of larger-scale resources such as oil, gas and precious resources as they become more readily available.

#### **4. Final Recommendations**

The United States should use diplomacy over all other instruments of national power to leverage other Arctic stakeholders into positions conducive to full international cooperation and should seek solutions to demilitarize the Arctic, like the Antarctic, in order to hold all countries accountable and ensure the best interests of all remain in the forefront. Seeking trade opportunities and building partnerships in both public and private sectors will increase momentum and position the United States for greater influence in the region. Additionally, efforts should focus on resolving current boundary issues and addressing Arctic governance as related to emerging issues while creating the requisite international conditions for sustainable development to promote human safety and overall responsible stewardship of the region.<sup>106</sup>

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<sup>106</sup> The White House, United States National Strategy for the Arctic Region, May 2013, 2, [http://www.whitehouse.gov/sites/default/files/docs/nat\\_arctic\\_strategy.pdf](http://www.whitehouse.gov/sites/default/files/docs/nat_arctic_strategy.pdf).

## APPENDIX. ARCTIC DATA TABLES

Table 1. Canada Military Influence—Arctic Data Table<sup>111</sup>

STAKEHOLDER	AIR ASSETS	AIR CAPABILITIES	LAND ASSETS	LAND CAPABILITIES	SEA ASSETS	SEA CAPABILITIES
CANADA <i>Ordinal Military Ranking = 2</i> <i>Relative Influence Score = 60</i>	18 CP-140 Antisubmarine warfare (ASW) aircraft	Locate/intercept submarines	5000x Canadian Rangers	Light-armed paramilitary force with patrol and recon role, trained for year-round Arctic operations	15 surface warships and 4x conventional submarines, all Arctic capable but not ice-strengthened	
	80x F/A 18 combat aircraft	Intercept bomber and recon a/c in Arctic	1x Arctic Army battalion (500 troops)	Regular Army battalion trained for Arctic ops	5x large icebreakers, 6x small icebreakers, all unarmed, can only operate in summer	Any summertime-only icebreaking requirement
	7x tankers	Support F/A 18 fleet, increase range and station time	Small military base Alert on Ellesmere Island, Nunavut	Stage and sustain troops in the Arctic	Nanisivik Naval Facility, Baffin Island	Naval base with docking and supply facilities
	6x joint uninhabited surveillance and target-acquisition system (JUSTAS) UAVs	Persistent maritime and Arctic patrol	Arctic training base, Resolute Bay, Nunavut	Train additional Arctic units, stage and sustain troops in the Arctic	4x Victoria-class (diesel-electrical) submarines (SS)	Limited capability to monitor underwater activity in key Arctic choke points, average one of four operational at a time, cannot operate under ice
	Air surveillance radars, underwater surveillance systems	Monitor Arctic air and sea traffic				
	"Polar Epsilon" earth observation satellites	Surveille Arctic region with high-resolution imagery				

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<sup>111</sup> Adapted from Siemon T. Wezeman, *Military Capabilities in the Arctic* (Stockholm International Peace Research Institute, 2012), <http://www.iceland.is/iceland-abroad/nato/news/iceland-in-nato/5206/>; J. J. Andersson, "The Race to the Bottom: Submarine Proliferation and International Security," *Naval War College Review* 68, no. 1 (2015), 12–29, <http://libproxy.nps.edu/login?url=http://search.proquest.com/docview/1626110549?accountid=12702>; Trefor Moss, "Frosty Relations: Militarizing the Arctic," *World Policy*, April 22, 2015, <http://www.worldpolicy.org/blog/2014/04/22/frosty-relations-militarizing-arctic>; "Russia Submarine Capabilities," NTI, June 10, 2014, <http://www.nti.org/analysis/articles/russia-submarine-capabilities/>.

Table 2. Denmark Military Influence—Arctic Data Table<sup>112</sup>

STAKEHOLDER	AIR ASSETS	AIR CAPABILITIES	LAND ASSETS	LAND CAPABILITIES	SEA ASSETS	SEA CAPABILITIES
DENMARK (including Greenland)  <u>Ordinal Military Ranking = 5</u>  <u>Relative Influence Score = 15</u>	3x unarmed maritime patrol aircraft	Limited ISR capability				
			Fromadskorps (Frogman Corps) special forces unit w/ partly Arctic role on Greenland	Elite maritime force with versatile offensive capabilities, Arctic capable	5x Arctic-capable (non-ice-strengthened) frigates	Minimal Arctic naval presence
			Slaedepatrulje Sirius (Sledge patrol Sirius)	Small military patrol force on Greenland	4x Thetis-class OPV/frigates	Capable of breaking ice up to 1m thick
					1x ice-strengthened large patrol craft	Heavily armed, operates from Greenland
					Royal Danish Navy base at Kangilinnguit (southern Greenland)	Potential growth area for basing capabilities

<sup>112</sup> Adapted from Siemon T. Wezeman, *Military Capabilities in the Arctic* (Stockholm International Peace Research Institute, 2012), <http://www.iceland.is/iceland-abroad/nato/news/iceland-in-nato/5206/>; J. J. Andersson, “The Race to the Bottom: Submarine Proliferation and International Security,” *Naval War College Review* 68, no. 1 (2015), 12–29, <http://libproxy.nps.edu/login?url=http://search.proquest.com/docview/1626110549?accountid=12702>; Trefor Moss, “Frosty Relations: Militarizing the Arctic,” *World Policy*, April 22, 2015, <http://www.worldpolicy.org/blog/2014/04/22/frosty-relations-militarizing-arctic>; “Russia Submarine Capabilities,” NTI, June 10, 2014, <http://www.nti.org/analysis/articles/russia-submarine-capabilities/>.

Table 3. Norway Military Influence—Arctic Data Table<sup>113</sup>

STAKEHOLDER	AIR ASSETS	AIR CAPABILITIES	LAND ASSETS	LAND CAPABILITIES	SEA ASSETS	SEA CAPABILITIES
<b>NORWAY</b> <i><u>Ordinal Military Ranking = 4</u></i>	6x P-3 long-range maritime patrol craft	20 years old, need modernization	Brigade Nord (Brigade North) (1–2 battalions)	Winter-trained but heavy mech unit, equipped for ops in Norway only	5x Arctic-capable (non-ice-strengthened) frigates	Arctic patrol
	60x F-16 combat aircraft	Very limited range outside of Norwegian Arctic			6x Ula-class submarines	Arctic patrol

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<sup>113</sup> Adapted from Siemon T. Wezeman, *Military Capabilities in the Arctic* (Stockholm International Peace Research Institute, 2012), <http://www.iceland.is/iceland-abroad/nato/news/iceland-in-nato/5206/>; J. J. Andersson, “The Race to the Bottom: Submarine Proliferation and International Security,” *Naval War College Review* 68, no. 1 (2015), 12–29, <http://libproxy.nps.edu/login?url=http://search.proquest.com/docview/1626110549?accountid=12702>; Trefor Moss, “Frosty Relations: Militarizing the Arctic,” *World Policy*, April 22, 2015, <http://www.worldpolicy.org/blog/2014/04/22/frosty-relations-militarizing-arctic>; “Russia Submarine Capabilities,” NTI, June 10, 2014, <http://www.nti.org/analysis/articles/russia-submarine-capabilities/>.

Table 4. Russia Military Influence—Arctic Data Table<sup>114</sup>

STAKEHOLDER	AIR ASSETS	AIR CAPABILITIES	LAND ASSETS	LAND CAPABILITIES	SEA ASSETS	SEA CAPABILITIES
RUSSIA  <i>Ordinal Military Ranking = 1</i>  <i>Relative Influence Score = 100</i>	100x long-range Tu-22 bombers	Full-range Arctic kinetic capability	Naval, Infantry and Army brigade, Kola Peninsula	Winter-trained troops, but organized and equipped for ops in Russia	Northern Fleet: Stationed at several large naval and air bases on Kola Peninsula	Nuclear-powered ballistic missile submarines, myriad of surface ships
	100x Il-38 maritime recon aircraft	Full-range Arctic reconnaissance	2x Arctic special forces brigades	Based at Pechenga, Kola Peninsula, highly capable force for Arctic ground operations	6x large armed ice breakers, 4x small thin icebreakers, 2ox civilian icebreakers	Robust, thick icebreaking capabilities
					11x SSBN (ballistic missile) submarines	Nuclear ballistic missile launch capable, minimal regional impact on military conflict in Arctic, large strategic impact on global scale
					8x SSGN (guided missile) submarines	Can carry unknown quantity of cruise missiles, to include nuclear armed, Russian SOF and underwater delivery vehicles to insert or extract forces
					17x SSN (general-purpose nuclear) submarines	General-purpose "fast attack" submarines capable of ASW and tactical employment in sea engagements
					20x SSK (diesel-electric) Kilo-class attack submarines	Control Arctic SLOCs, conduct ASW throughout Arctic region

<sup>114</sup> Adapted from Siemon T. Wezeman, *Military Capabilities in the Arctic* (Stockholm International Peace Research Institute, 2012), <http://www.iceland.is/iceland-abroad/nato/news/iceland-in-nato/5206/>; J. J. Andersson, "The Race to the Bottom: Submarine Proliferation and International Security," *Naval War College Review* 68, no. 1 (2015), 12–29, <http://libproxy.nps.edu/login?url=http://search.proquest.com/docview/1626110549?accountid=12702>; Trefor Moss, "Frosty Relations: Militarizing the Arctic," *World Policy*, April 22, 2015, <http://www.worldpolicy.org/blog/2014/04/22/frosty-relations-militarizing-arctic>; "Russia Submarine Capabilities," NTI, June 10, 2014, <http://www.nti.org/analysis/articles/russia-submarine-capabilities/>.

Table 5. United States Military Influence—Arctic Data Table<sup>115</sup>

STAKEHOLDERS	AIR ASSETS	AIR CAPABILITIES	LAND ASSETS	LAND CAPABILITIES	SEA ASSETS	SEA CAPABILITIES
UNITED STATES  <u>Ordinal Military Ranking = 2</u>  <u>Relative Influence Score = 60</u>	NORAD interceptor aircraft, Alaska	Intercept air threats	Several military units with limited cold-weather and/or mountaineering training, none specialized	U.S. Navy ships all Arctic capable on limited basis		
	Eielson Air Force Base, Fairbanks	Combat and support a/c, including F-22 interceptors and airborne early-warning aircraft, large-scale ground scale basing contingency			1x heavy icebreaker, 1x inoperable heavy icebreaker (dry dock)	Very limited heavy icebreaking capability IVO Alaska
	Elmendorf-Richardson AFB, Anchorage	Combat and support a/c, including F-22 interceptors and airborne early-warning aircraft, large-scale ground scale basing contingency			14xSSBN (ballistic missile) submarines	Nuclear ballistic missile launch capable, minimal regional impact on military conflict in Arctic, large strategic impact on global scale
	8–10 Coast Guard HC-130 aircraft	Unarmed Arctic/Bering Sea patrol			4x SSGN (guided missile) submarines	Can carry up to 70 Tomahawk cruise missiles, four SEAL platoons, and several four-man underwater delivery vehicles to insert or extract forces
	Thule AFB, Greenland	Potential future contingency base			53x SSN (general-purpose nuclear) submarines	General-purpose "fast attack" submarines capable of ASW and tactical employment in sea engagements

<sup>115</sup> Adapted from Siemon T. Wezeman, *Military Capabilities in the Arctic* (Stockholm International Peace Research Institute, 2012), <http://www.iceland.is/iceland-abroad/nato/news/iceland-in-nato/5206/>; J. J. Andersson, “The Race to the Bottom: Submarine Proliferation and International Security,” *Naval War College Review* 68, no. 1 (2015), 12–29, <http://libproxy.nps.edu/login?url=http://search.proquest.com/docview/1626110549?accountid=12702>; Trefor Moss, “Frosty Relations: Militarizing the Arctic,” *World Policy*, April 22, 2015, <http://www.worldpolicy.org/blog/2014/04/22/frosty-relations-militarizing-arctic>; “Russia Submarine Capabilities,” NTI, June 10, 2014, <http://www.nti.org/analysis/articles/russia-submarine-capabilities/>.

Table 6. Iceland Military Influence—Arctic Data Table<sup>116</sup>

STAKEHOLDER	AIR ASSETS	AIR CAPABILITIES	LAND ASSETS	LAND CAPABILITIES	SEA ASSETS	SEA CAPABILITIES
<b>ICELAND</b>  <u>Ordinal Military Ranking = 6</u>	Fully dependent on United States Air Force	N/A	Special Unit of the state police	Minimal capability to resist homeland invasion for short period of time	Icelandic Defence Force	Defend SLOCS to and from the island during wartime
					Icelandic Coast Guard (armed)	Regular surveillance of economic zone and territorial waters

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<sup>116</sup> Adapted from Siemon T. Wezeman, *Military Capabilities in the Arctic* (Stockholm International Peace Research Institute, 2012), <http://www.iceland.is/iceland-abroad/nato/news/iceland-in-nato/5206/>; J. J. Andersson, “The Race to the Bottom: Submarine Proliferation and International Security,” *Naval War College Review* 68, no. 1 (2015), 12–29, <http://libproxy.nps.edu/login?url=http://search.proquest.com/docview/1626110549?accountid=12702>; Trefor Moss, “Frosty Relations: Militarizing the Arctic,” *World Policy*, April 22, 2015, <http://www.worldpolicy.org/blog/2014/04/22/frosty-relations-militarizing-arctic>; “Russia Submarine Capabilities,” NTI, June 10, 2014, <http://www.nti.org/analysis/articles/russia-submarine-capabilities/>.

Table 7. Finland Military Influence—Arctic Data Table<sup>117</sup>

STAKEHOLDER	AIR ASSETS	AIR CAPABILITIES	LAND ASSETS	LAND CAPABILITIES	SEA ASSETS	SEA CAPABILITIES
<b>FINLAND</b>  <i><u>Ordinal Military Ranking = 7</u></i>  <i><u>Relative Influence Score = 25</u></i>			Jaeger Brigade (special operations)	Specializes in polar warfare (small-unit level)		
			Multiple military bases in northern Finland	Train and sustain ground and air forces for Arctic operations		

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<sup>117</sup> Adapted from Siemon T. Wezeman, *Military Capabilities in the Arctic* (Stockholm International Peace Research Institute, 2012), <http://www.iceland.is/iceland-abroad/nato/news/iceland-in-nato/5206/>; J. J. Andersson, “The Race to the Bottom: Submarine Proliferation and International Security,” *Naval War College Review* 68, no. 1 (2015), 12–29, <http://libproxy.nps.edu/login?url=http://search.proquest.com/docview/1626110549?accountid=12702>; Trefor Moss, “Frosty Relations: Militarizing the Arctic,” *World Policy*, April 22, 2015, <http://www.worldpolicy.org/blog/2014/04/22/frosty-relations-militarizing-arctic>; “Russia Submarine Capabilities,” NTI, June 10, 2014, <http://www.nti.org/analysis/articles/russia-submarine-capabilities/>.

Table 8. Sweden Military Influence—Arctic Data Table<sup>118</sup>

STAKEHOLDER	AIR ASSETS	AIR CAPABILITIES	LAND ASSETS	LAND CAPABILITIES	SEA ASSETS	SEA CAPABILITIES
<b>SWEDEN</b> <u>Ordinal Military Ranking = 7</u>  <u>Relative Influence Score = 25</u>	24x Gripen fighter jet aircraft	Limited range Arctic kinetic/ISR capability	Norboten Regiment (Armed Forces winter unit)	Arctic-armored light infantry and ranger regiment capable of conducting a diverse set of missions in the Arctic climate		
	Luleau Arctic Air Base	Stage and sustain defensive troops in Swedish Arctic territory				

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<sup>118</sup> Adapted from Siemon T. Wezeman, *Military Capabilities in the Arctic* (Stockholm International Peace Research Institute, 2012), <http://www.iceland.is/iceland-abroad/nato/news/iceland-in-nato/5206/>; J. J. Andersson, “The Race to the Bottom: Submarine Proliferation and International Security,” *Naval War College Review* 68, no. 1 (2015), 12–29, <http://libproxy.nps.edu/login?url=http://search.proquest.com/docview/1626110549?accountid=12702>; Trefor Moss, “Frosty Relations: Militarizing the Arctic,” *World Policy*, April 22, 2015, <http://www.worldpolicy.org/blog/2014/04/22/frosty-relations-militarizing-arctic>; “Russia Submarine Capabilities,” NTI, June 10, 2014, <http://www.nti.org/analysis/articles/russia-submarine-capabilities/>.

Table 9. Overall Scoring Distribution—Arctic Data Table<sup>119</sup>

<b>Ordinal Military Ranking</b>	<b>Relative Influence Score</b>
Russia	100
Canada	60
United States	40
Norway	25
Denmark	15
Iceland	10
Finland	25
Sweden	15

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<sup>119</sup> Adapted from Siemon T. Wezeman, *Military Capabilities in the Arctic* (Stockholm International Peace Research Institute, 2012), <http://www.iceland.is/iceland-abroad/nato/news/iceland-in-nato/5206/>; J. J. Andersson, “The Race to the Bottom: Submarine Proliferation and International Security,” *Naval War College Review* 68, no. 1 (2015), 12–29, <http://libproxy.nps.edu/login?url=http://search.proquest.com/docview/1626110549?accountid=12702>; Trefor Moss, “Frosty Relations: Militarizing the Arctic,” *World Policy*, April 22, 2015, <http://www.worldpolicy.org/blog/2014/04/22/frosty-relations-militarizing-arctic>; “Russia Submarine Capabilities,” NTI, June 10, 2014, <http://www.nti.org/analysis/articles/russia-submarine-capabilities/>.

Table 10. Overall Gross Domestic Product Distribution—Arctic Data Table<sup>120</sup>

<b>Actor</b>	<b>% GDP from Arctic</b>	<b>Ordinal rank</b>	<b>% of Arctic GRP (gross regional production)</b>	<b>Ordinal rank</b>	<b>% of Arctic territory</b>	<b>Ordinal rank</b>
<b>CANADA</b>	2	7	2	7	22	2
<b>DENMARK (GREENLAND)</b>	4	6	1	8	12	3
<b>NORWAY</b>	7	4	4	4	1	8
<b>RUSSIA</b>	16	2	70	1	52	1
<b>UNITED STATES</b>	0.5	8	12	2	10	4
<b>ICELAND</b>	100	1	3	6	1	8
<b>FINLAND</b>	12	3	6	3	1	8
<b>SWEDEN</b>	7	4	4	4	1	8

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<sup>120</sup> Adapted from Mäenpää, Ilmo. "Comparative analysis of Arctic economies at macro level." *The economy of the north* (2008).

## LIST OF REFERENCES

- Abdollahian, Mark, Michael Baranick, Brian Efird, and Jacek Kugler. *Senturion: A Predictive Political Simulation Model*. Washington, DC: National Defense University, 2006.
- Acertas Strategy and Analytics. “Senturion.” Accessed May 18, 2016.  
<http://www.acertas-analytics.com/senturion/>.
- Arctic Portal. “Arctic Search and Rescue Agreement.” May 23, 2011.  
<http://library.arcticportal.org/1474/>
- Astill, James. “The Melting North.” *Economist*. June 16, 2012.
- Bonds, Eric. “Challenging Global Warming’s New ‘Security Threat’ Status.” *Peace Review* 27, no. 2 (2015).
- Borgerson, Scott and Michael Byers. “The Arctic Front in the Battle to Contain Russia.” *Wall Street Journal*. March 8, 2016. <http://www.wsj.com/articles/the-arctic-front-in-the-battle-to-contain-russia-1457478393>.
- Breedlove, Philip M. *United States European Command Theater Strategy*. Washington, DC: Department of Defense, 2015.
- Carman, Jessie. “Economic and Strategic Implications of Ice-Free Arctic Seas.” In *Globalization and Maritime Power*, edited by Sam J. Tangredi, 171–188. Washington, DC: National Defense University, 2002.
- Coastal Response and Research Center. *Opening the Arctic Seas: Envisioning Disasters and Framing Solutions*. Durham: University of New Hampshire, 2009.
- Danish Defence Agreement 2013–2017*. Copenhagen. November 30, 2012.  
<http://www.fmn.dk/eng/allabout/Documents/TheDanishDefenceAgreement2013-2017english-version.pdf>.
- David, Mihaela. “Strong Foothold or on Thin Ice? US Strategies for Development, Environmental Stewardship and Security in the Arctic.” In *Governing the North American Arctic*. Edited by Dawn Alexandrea Berry, Nigel Bowles, and Halbert Jones. London: Palgrave Macmillan, 2016.
- Department of Homeland Security. “Polar Icebreaker Mission Need Statement, Version 1.0.” June 28, 2013.
- Gorenburg, Dmitry. “Russian Interests and Policies in the Arctic.” War on the Rocks. August 7, 2014. <http://warontherocks.com/2014/08/russian-interests-and-policies-in-the-arctic/>.

- Government Offices of Sweden. *Sweden's Strategy for the Arctic Region*. Stockholm: Ministry of Foreign Affairs, 2011. <http://www.openaid.se/wp-content/uploads/2014/04/Swedens-Strategy-for-the-Arctic-Region.pdf>.
- Henriksen, Tore and Geir Ulfstein. "Maritime Delimitation in the Arctic: The Barents Sea Treaty." *Ocean Development & International Law* 42, no. 1–2 (2011). [http://www.worldpolicy.org/sites/default/files/uploaded/image/68\\_a\\_briefing\\_defence.pdf](http://www.worldpolicy.org/sites/default/files/uploaded/image/68_a_briefing_defence.pdf).
- IEEE. "Russian National Security Strategy." December 31, 2015. <http://www.ieee.es/Galerias/fichero/OtrasPublicaciones/Internacional/2016/Russia-n-National-Security-Strategy-31Dec2015.pdf>.
- Jones, Bruce, Andrew Hart, and David Steven. *Chill Out: Why Cooperation Is Balancing Conflict among Major Powers in the New Arctic*. Washington, DC: Brookings Institution, May 30, 2012.
- Kaplan, Robert D. *The Revenge of Geography: What the Map Tells Us about Coming Conflicts and the Battle against Fate*. New York: Random House, 2012.
- Kennedy, Paul. *Rise and Fall of Great Powers: Economic Change and Military Conflict from 1500–2000*. New York: Fontana Press, 1989.
- Kerry, John. Remarks given at the Arctic Council Ministerial Session. Kiruna, Sweden. May 15, 2013. <http://www.state.gov/secretary/remarks/2013/05/209403.htm>.
- King, Hobart. "Oil and Natural Gas Resources of the Arctic." Geology.com. Accessed November 29, 2016. [geology.com/articles/arctic-oil-and-gas](http://geology.com/articles/arctic-oil-and-gas).
- Kingdom of Denmark Strategy for the Arctic 2011–2020*. Ministry of Foreign Affairs, Government of Greenland, and Government of the Faroe Islands. August 2011. [http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwjhy9iNr-fOAhUG4mMKHRPlCEsQFggcMAA&url=http%3A%2F%2Fusa.um.dk%2Fen%2Fmedia%2FUSA%2FWashington%2FArctic\\_strategy.pdf](http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwjhy9iNr-fOAhUG4mMKHRPlCEsQFggcMAA&url=http%3A%2F%2Fusa.um.dk%2Fen%2Fmedia%2FUSA%2FWashington%2FArctic_strategy.pdf).
- Kraska, James, ed. *Arctic Security in an Age of Climate Change*. New York: Cambridge University Press, 2011.
- Larrabee, Stephen F. "Russia, Ukraine and Central Europe: The Return of Geopolitics." *Journal of International Affairs* 63, no. 2 (2010).
- Lawrence, T. E. *Seven Pillars of Wisdom: A Triumph*. New York: Knopf Doubleday, 1991.
- Lowenthal, Mark. *Intelligence: From Secrets to Policy*. 2<sup>nd</sup> ed. Washington, DC: CQ Press, 2003.

- Mäenpää, Ilmo. "Comparative Analysis of Arctic Economies at Macro Level." in *The Economy of the North*. Edited by Solveig Glomsrød and Iulie Aslaksen. Oslo: Statistics Norway, 2009.
- Matz-Luck, Nele. "Planting a Flag in Arctic Waters: Russia's Claim to the North Pole." *Goettingen Journal of International Law* 1 (2009): 235–255.
- Miller, Brandon. "Amid Higher Global Temperatures, Sea Ice at Record Lows at Poles," CNN, last modified November 19, 2016, <http://www.cnn.com/2016/11/18/world/sea-ice-arctic-antarctic-lows/index.html>.
- Ministry for Foreign Affairs. "A Parliamentary Resolution on Iceland's Arctic Policy." March 28, 2011. <https://www.mfa.is/media/nordurlandaskrifstofa/A-Parliamentary-Resolution-on-ICE-Arctic-Policy-approved-by-Althingi.pdf>.
- Moss, Trefor. "Frosty Relations- Arctic." *World Policy Journal*, no. 68, 74-75. Accessed July 28, 2016. [http://www.worldpolicy.org/sites/default/files/uploaded/image/68\\_a\\_briefing\\_definition.pdf](http://www.worldpolicy.org/sites/default/files/uploaded/image/68_a_briefing_definition.pdf).
- National Strategy for the Arctic Region. Washington, DC: White House, 2013.
- National Security Strategy. Washington, DC: White House, February 2015.
- National Snow and Ice Data Center (NSIDC). "Arctic Sea Ice News and Analysis." Accessed October 15, 2016. <http://nsidc.org/arcticseainews/>
- Navy Task Force Climate Change. *U.S. Navy Arctic Roadmap 2014–2030*. Washington, D.C., February 2014.
- Nilsen, Thomas. "Finland Expands Arctic Cooperation with Russia." *Barents Observer*, February 10, 2011. <http://barentsobserver.com/en/sections/arctic/finland-expands-arctic-cooperation-russia>.
- Nilsson, Sven-Christer and Göran Larsbrink. *Swedish National Security: Challenges and Opportunities beyond 2014*. Stockholm: Royal Swedish Academy of War Sciences, 2013. [http://kkrrva.se/for-sveriges-sakerhet/6\\_swedish\\_national\\_security.pdf](http://kkrrva.se/for-sveriges-sakerhet/6_swedish_national_security.pdf).
- Norwegian Ministry of Foreign Affairs. "Norway's Arctic Policy." November 2014. [https://www.regjeringen.no/globalassets/departementene/ud/vedlegg/nord/nordkoden\\_en.pdf](https://www.regjeringen.no/globalassets/departementene/ud/vedlegg/nord/nordkoden_en.pdf).
- O'Rourke, Ronald. *Changes in the Arctic: Background and Issues for Congress*. Washington, DC: Congressional Research Service, 2016.

- Prime Minister's Office, Finland. "Finland's Strategy for the Arctic Region 2013." August 23, 2013.  
<http://vnk.fi/documents/10616/334509/Arktinen+strategia+2013+en.pdf/6b6fb723-40ec-4c17-b286-5b5910fbecf4>.
- Rountree, Stephen. "Global Warming Triggers and International Race for the Arctic." *U.S. News and World Report*. October 9, 2008.  
<http://www.usnews.com/articles/news/world/2008/10/09/global-warming-triggers-an-international-race-for-the-artic/photos/#1>.
- "Russia Eyes Arctic Deal with Denmark." *The Local*, September 8, 2016.  
<https://www.thelocal.dk/20160908/russia-eyes-arctic-deal-with-denmark>.
- Russian Federation's Policy for the Arctic to 2020*. Arctic Knowledge Hub. First published in Russian governmental newspaper *Rossiyskaya Gazeta*, September 18, 2008. <http://www.arctis-search.com/Russian+Federation+Policy+for+the+Arctic+to+2020>.
- Safety and Shipping Review 2015*. Munich, Germany: Allianz Global Corporate & Specialty., March 2015.
- Sanger, David E. *Confront and Conceal: Obama's Secret Wars and Surprising Use of American Power*. New York: Crown, 2012.
- Senturion Forecasting LLC. *Senturion Analyst Guide Government*, Version 5.2. New York, Senturion Forecasting LLC.
- "The Strategic Priorities of the Foreign Service." September 17, 2015.  
<http://formin.finland.fi/public/download.aspx?ID=149755&GUID={D1BD1A51-D435-45F1-99BE-2DB9BCC4DD23}>.
- "Study: Northern Sea Route to Overpower Suez Canal." *World Maritime News*, May 20, 2015. <http://worldmaritimenews.com/archives/161360/study-northern-sea-route-to-overpower-suez-canal/>.
- The United Nations Convention on the Law of the Sea (A Historical Perspective)*. United Nations Division for Ocean Affairs and the Law of the Sea, Exclusive Economic Zone, 2008.
- U.S. Department of State. "Maritime Matters: Search and Rescue in the Arctic; Agreement between the United States of America and Other Governments, Annex 12." Nuuk. May 12, 2011.
- The University of Maine. Climate Change Institute. Orono, ME: University of Maine, 2016.

White House. *Implementation Plan for the National Strategy for the Arctic Region*.  
Washington, DC: White House, January 2014.

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